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THE ERIGONINE SPIDERS OF NORTH AMERICA. PART 6.[1] THE GENUS *WALCKENAERIA* BLACKWALL (ARANEAE, LINYPHIIDAE)

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ABSTRACT

A survey is reported of the North American species of the erigonine genus *Walckenaeria* s.lat. *Erigone (Minyriolus) castanea* Emerton, *Sisicottus cornuellus* Chamberlin and Ivie and *Sisis saniuana* Chamberlin and Ivie are transferred to *Walckenaeria.* The following synonyms are proposed: *Cornicularia varipes* Banks = *W. communis* (Emerton); *Lophocarenum (Mythoplastoides) abruptum* Emerton = *W. atrotibialis* O. P.-Cambridge; *Trachynella longidens* Holm = *W. castanea* (Emerton); *W. vidua* Wunderlich = *W. capito* (Westring); *Heteroprosopotheca* Wunderlich = *Walckenaeria* Blackwall; *Kastonia* Wunderlich = *Microcornicularia* Wunderlich; *Pseudocornicularia* Wunderlich = *Microcornicularia* Wunderlich. *W. karpinskii* auct. is not *W. karpinskii* O. P.-Cambridge, and is renamed *W. holmi. Cornicularia selma* Chamberlin and *Tigellinus mesus* Chamberlin are excluded from the genus. *Walckenaeria* can be defined on the basis of somatic characters,and on the form of the palpal organs, but definition on the basis of the female genitalia has not been possible. The genus now comprises 76 species in N. America, including the following 49 new taxa: *W. aenea, W. anceps, W. aprilis, W. arcana, W. arctica, W. aurata, W. bifida, W. blanda, W. carolina, W. clavipalpe, W. columbia, W. crocea, W. discolor, W. dondalei, W. emarginata, W. exigua, W. faceta, W. fallax, W. floridiana, W. fraudatrix, W. fusciceps, W. gertschi, W. helenae, W. holmi, W. iviei, W. latens, W. maesta, W. mexicana, W. microspiralis, W. occidentalis, W. oregona, W. palustris, W. pellax, W. prominens, W. puella, W. pullata, W. reclusa, W. redneri, W rufula, W. rutilis, W. septentrionalis, W. serrata, W. solivaga, W. subdirecta, W. subpallida, W. subspiralis, W. subvigilax, W. tenella, W. teres.* The species are assigned to nine species groups, several of which appear to be endemic to N. America. Descriptions, diagnoses and distribution maps are given for each species.

INTRODUCTION

The genus *Walckenaeria* was erected by Blackwall (1833) for the European species *W. acuminata* and *W. cuspidata* Bl. The original spelling of the name was as given above, but Blackwall (1841) changed the name to *Walckenaera*, and this spelling was used in the arachnological literature for a century or more (see Bonnet 1959:4807). Despite the long usage of the spelling *Walckenaera*, the I.C.Z.N. Rules (Art. 32[a]) require a return to the original spelling, and this is being adopted by recent authors.

The N. American species included in the genera *Cornicularia* Menge and *Tigellinus* Simon (now transferred to *Walckenaeria*), and in *Walckenaeria* itself, were described by Crosby and Bishop (1931). Wunderlich (1972) has published a review of the genus *Walckenaeria* which covers the European species and some N. American and Nepalese species.

[1] For Part 5 of this series, see Bull. Amer. Mus. Nat. Hist., 170:242-253.

GENUS *WALCKENAERIA* BLACKWALL

Walckenaeria Blackwall 1833:105; Roewer 1942:668; Wund

Walckenaeria Blackwall 1833:105; Roewer 1942:668; Wunderlich 1972:371. Type species *W. acuminata* Bl. by first species rule.

Walckenaera Blackwall 1841:219; Simon 1884:813 and 1926:413, 507; Crosby and Bishop 1931:378; Locket and Millidge 1953:191; Bonnet 1959:4807; Wiehle 1960:105.

Wideria Simon 1864:477; Simon 1884:799 and 1926:405, 504; Roewer 1942:669; Locket and Millidge 1953:193; Bonnet 1959:4817; Wiehle 1960:110. type species *Theridion anticum* Wider by first species rule.

Cornicularia Menge 1868:226; Simon 1884:843 and 1926:417, 508; Crosby and Bishop 1931:359; Roewer 1942:660; Locket and Millidge 1953:204; Bonnet 1956:1219; Wiehle 1960:142. Type species *Walckenaera unicornis* O.P.-Cambridge by monotypy.

Spiropalpus Emerton 1882:39. Type species *Spiropalpus spiralis* Emerton by monotypy.

Prosopotheca Simon 1884:829; Simon 1926:414, 507; Roewer 1942:664; Locket and Millidge 1953:201; Bonnet 1958:3781; Wiehle 1960:159. Type species *Theridion monoceros* Wider by designation.

Tigellinus Simon 1884:828; Simon 1926:414, 507; Crosby and Bishop 1931:377; Roewer 1942:666; Locket and Millidge 1953:204; Bonnet 1959:4620; Wiehle 1960:176. Type species *Phalops furcillatus* Menge by monotypy.

Trachynotus Dahl 1886:95; Simon 1926:412, 506. Type species *Walckenaera obtusa* Bl. by monotypy.

Trachynella Braendegaard 1932:19 (*nom. nov.* for *Trachynotus* praeocc.); Roewer 1942:667; Locket and Millidge 1953:199; Bonnet 1959:4674; Wiehle 1960:169.

Definition.—This genus is composed of spiders with a total length of 1.35-4.0 mm. The female carapace is usually unmodified, but is occasionally distinctly raised anteriorly (e.g. Fig. 101). The male carapace in many species carries a lobe (e.g. Figs. 98, 188) or a horn (e.g. Figs. 142, 267); where there is a lobe, this carries the posterior median eyes. The males of many of the N. American species have the carapace unmodified. The male horns of some N. American species are furnished with spatulate hairs, which under high magnification are seen to be trifurcate (Fig. 305). Each of these trifurcate hairs arises from a deep pit on the horn (Fig. 306); these pits may possibly have the same function as the cephalic holes in other male erigonines, that is, to secrete sexual pheromones (Blest and Taylor 1977). The horn has been broken off in a number of the males examined, and this is probably evidence that the female grasps the horn during mating. There are somewhat similar trifurcate hairs on the turret of the type species (Wiehle 1960: Fig. 183c) and in some other European species (Kronestedt 1980: Figs. 1-3). There is a file on the lateral margins of the chelicerae in both sexes; the spacing of the striae is sometimes of taxonomic importance. The sternum is longer than wide, with the ratio length/width at least 1.1:1. The pedicel is distinctly sclerotized, more so than in most erigonine genera, and is quite conspicuous in a few species (Fig. 167). The abdomen is without scuta and is normally unicolorous. The European and practically all the N. American species have the tibial spines 2211 in both sexes; the spines are slender and are often less developed in the male, particularly on legs I-II. In one American species *(W. aenea)* and in some central African species, however, the tibial spines are 1111 (Holm 1962:176; Locket and Russell-Smith 1980:69). All the metatarsi have a trichobothrium; the value of TmI for the N. American species lies in the range 0.35-0.75. The superior tarsal claws of legs I-II, and often of leg III, are relatively large and strongly pectinate (Figs. 111, 112); the claws on leg IV have the teeth greatly reduced. The number of teeth on the anterior claws varies from species to species.

The palpal tibia of the male is drawn out distally into an apophysis of variable form, and in some species there are additional apophyses. The palpal tibia of both sexes has 3 trichobothria; in one species *(W. saniuana)* the number is reduced to 2 in the male. The paracymbium of the male palp has a simple horseshoe shape. The haematodocha of the palpal bulb is clearly visible on the mesal side (Figs. 1, 3), and often also on the ectal side (e.g. Fig. 78). The subtegulum and tegulum offer no peculiarities. The suprategulum curves downwards, away from the cymbium (Figs. 1, 2, 3, 5, 7), and this extension (suprategular apophysis, SA) often terminates in a dark colored point. A membraneous apophysis, originating at the stalk but attached also to the SA, runs partway down the mesal side of the SA before passing over to the ectal side; the terminal part of the membrane then curves upwards, and in the living spider supports the distal part of the embolus. The embolic division (ED) of the palp comprises a simple tailpiece and a coiled embolus of about 1.5-2 turns (e.g. Fig. 9); the embolus is a flat ribbon, at least basally, with a thickened black sclerotized margin. The female epigynum exhibits considerable variability in external appearance. In the majority of the species, the epigynum is enclosed by a simple plate through which the outlines of the apodemes, the spermathecae and the internal ducts are visible (e.g. Fig. 15). The openings to the spermathecal ducts lie in a small depression, or sometimes 2 depressions, which are difficult to see. In a few species, however, there are two tongue-like plates arising from the epigynal surface (e.g. Fig. 278); in these species, the openings to the ducts appear to lie beneath the plates. Internally the spermathecal duct passes from the spermatheca towards the median line by a curved pathway of varying complexity, and then runs posteriorly in a curve to the openings; the two curved, pincer-like ducts leading to the genital openings (e.g. Figs. 25, 178) often give a characteristic appearance to the epigynum. The length of the internal duct shows a good deal of variation, the length often showing some correlation with the length of the male embolus. The anterior portion of the duct, particularly where this is long, appears to lie along the margins of a twisted lamella (Figs. 22, 105) which is attached to the spermatheca and apodeme. In a few species, the duct passes to the lateral side of the spermatheca before curving back to the median line and the openings (Figs. 290, 297).

The male palpal organs *Walckenaeria* have a constant form throughout the genus, and this can be regarded as a derived character which supports the hypothesis that the genus is monophyletic. There are, however, several genera in which the palpal structure is very close to that of *Walckenaeria*; in particular the myrmecophilous genus *Evansia* O.P.-Cambridge and the genera *Moebelia* Dahl, *Minyriolus* Simon and *Typhochrestus* Simon (Merrett 1963:462). The female genitalia have a somewhat variable form, and no common character which can be used to define the genus has been identified. *Walckenaeria* is one of the few erigonine genera which can be defined and diagnosed by somatic characters. Other erigonine genera may have strongly pectinate tarsal claws, but the combination of this character with the elongated sternum seems to be present only in *Walckenaeria.*

Synonymy.–Most of the previously described species now included in the genus *Walckenaeria* have in the past been assigned to other genera, particularly to *Cornicularia, Wideria, Prosopotheca, Tigellinus* and *Trachynella.* These genera were defined principally on eye characters and on the form of the male carapace (Simon 1894). It was pointed out (Locket and Millidge 1953:191; Miller 1959:56) that these genera were rather artificial, and that the species should probably be united into the single genus *Walckenaeria.* In his revision of this genus, Wunderlich (1972) reduced *Cornicularia, Wideria, Prosopotheca*

and *Tigellinus* to the status of subgenera, with *Trachynella* regarded as a synonym of the nominate subgenus *Walckenaeria.* He also erected a number of new subgenera.

Species transferred to *Walckenaeria*: The N. American species previously placed in *Cornicularia, Tigellinus* and *Prosopotheca* have been transferred into *Walckenaeria.* On the basis of the genitalia, the pectinate tarsal claws and the elongated sternum, the species *Minyriolus castaneus* (Emerton), *Sisis saniuana* Chamberlin and Ivie and *Sisicottus cornuella* Chamberlin and Ivie have also been transferred to *Walckenaeria. Lophocarenum abruptum* Emerton, placed in *Mythoplastiodes* by Crosby and Bishop (1933) and in *Entelecara* by Hackman (1954), is a synonym of *Walckenaera atrotibialis* O.P.-Cambridge, and is included in this paper under that name (see *W. atrotibialis* description).

Species excluded from *Walckenaeria:* The following species have not been included in this study.

Cornicularia selma Chamberlin (1948:526). This species was based on two females from Oregon, but these have not been traced. The figure given for the epigynum indicates that the species is probably not a *Walckenaeria.*

Prosopotheca transversa Crosby. According to Crosby and Bishop (1931) this species was based on an immature female of *Tennesseellum formicum* (Emerton).

Tigellinus mesus Chamberlin (1948:556). This species was based on a single female from Colorado, but the specimen cannot be found. The figure given for the epigynum indicates that the species is probably not a *Walckenaeria.*

Tigellinus (?) perditus Chamberlin (1948:555). This species was based on two females of uncertain origin, and the specimens cannot be found. This species is almost certainly a *Walckenaeria*, and the epigynum is similar to that of one of the species described in this paper. In the absence of Chamberlin's specimens, however, it has not been possible to include the species in the present study.

Species and species groups.—In N. America the genus *Walckenaeria* comprises 76 known species (Tables 1-3); there can be little doubt that with future discoveries this number will approach 100. I have split the species into nine species groups, which are based mainly on the form of the male carapace and on the male genitalia. Definition of the groups on the basis of the epigyna is not very satisfactory; the epigynal differences in many cases lie more in the visual appearance than in any basic difference in form, and the differences can be indicated only by figures. The species groups given in this paper are in substantial agreement with the subgenera proposed by Wunderlich (1972), but because of the uncertainties involved in defining these groups I regard it as preferable at the present time not to regard them as formal named subgenera. The species groups used are defined as follows.

1. *acuminata* Group (based on *W. acuminata* Bl.)

The male carapace may have a lobe which carries the posterior median eyes; in most N. American species, however, the carapace is unmodified. The palpal tibia usually bears a single apophysis of the general form shown in Figs. 67-70, but there is an additional lateral apophysis in some species (e.g. Figs. 72, 87). The SA ends in a simple blunt point (Fig. 1) which is usually not visible in the unexpanded palp. The embolic coil can be very large (Fig. 8) to small (Fig. 123). The female epigynum has the anterior area either clear of markings (Fig. 127) or carries the outlines of long ducts (e.g. Figs. 15, 38). This group is equivalent to the nominate subgenus *Walckenaeria* (Wunderlich 1972), of which *Heteroprosopotheca* Wunderlich is a synonym (NEW SYNONYM: see *W. capito*). This group is distributed throughout the northern hemisphere.

2. *directa* Group (based on *W. directa* [O.P.-Cambridge])

The male carapace carries anteriorly a horn (Fig. 142) or other modification (e.g. Fig. 147), which is clothed at least in part with conspicuous spatulate hairs (Fig. 303); the *tibialis* group have a similar horn. The palpal tibia is as shown in Figs. 168-171; a few species in the *minuta* group have rather similar tibiae. The SA terminates in a lightly sclerotized sickle-shaped appendage (Fig. 137); the membraneous part arising mesally from the stalk is strongly developed to give a sheet-like structure on the ectal side (Figs. 133, 135, 138). The embolic coil is of medium size (Fig. 135). The female epigynum is of the form shown in Figs. 175, 176; all the species except *W. carolina* (Fig. 177) have closely similar epigyna. This group corresponds with the subgenus *Pseudoprosopotheca* Wunderlich, except that *W. tibialis* and *W. tumida* are excluded. The group appears to be endemic to N. America.

3. *tibialis* Group (based on *W. tibialis* [Emerton])

The male carapace has a short, stout horn (Fig. 146) clothed anteriorly with spatulate hairs. The palpal tibia is as shown in Figs. 172-174. The SA terminates in a curved spike and the embolic coil is small in size (Figs. 182-185). The female epigynum is as shown in Figs. 179, 180. This group seems to be endemic to N. America.

4. *tricornis* Group (based on *W. tricornis* [Emerton])

The male carapace has a lobe, which is forked anteriorly (Figs. 188, 189) and carries the PM eyes. The palpal tibia has a lateral apophysis which differs from species to species (Figs. 194-202). The SA terminates in a black sclerotized part which may be forked distally, and the embolic coil is of medium size (Fig. 186). The female epigynum has two forms (e.g. Figs. 203, 210). There are no representatives of this group in Europe, but it is possible that some of the central African *"Tigellinus"* species (Holm 1962) are related; certainly some of the female genitalia figured by Holm appear similar to those of the N. American species. This group corresponds with the subgenus *Pseudotigellinus* Wunderlich.

5. *minuta* Group (based on *W. minuta* [Emerton])

The male carapace has a horn of variable form (e.g. Figs. 229, 238) arising from the ocular area. The palpal tibia has two apophyses (Figs. 221-228), the lateral one having stiff black bristles along the margin in some species. The SA terminates in a black spike, which is clearly visible on the ectal side (Figs. 213-217), and the embolic coil is of medium size (Fig. 213). The female epigynum has two forms (Figs. 242, 246), but the internal genitalia are of a similar pattern in all the species (Figs. 250-253). This group corresponds with the subgenus *Microcornicularia* Wunderlich. *Pseudocornicularia* Wunderlich (type species *W. thrinax*) and *Kastonia* Wunderlich (type species *W. pinocchio*) become synonyms of *Microcornicularia* – NEW SYNONYMS. On present knowledge this group is endemic to N. America, but the E. African species *Walckenaeria (Tigellinus) meruensis* Tullgren (known only from the female: Holm 1962) has the epigynum and internal genitalia very similar to those of the N. American species in this group (Fig. 248, cf. Holm's Plate 6, Figs. 12, 13, and Figs. 250, 252 cf. Holm's Fig. 72).

6. *unicornis* Group (based on *W. unicornis* [O.P.-Cambridge])

The male carapace has a broad horn within the ocular area (Figs. 267-272); this horn is quite different in form from that of the *directa* group, and is not clothed with spatulate hairs. The palpal tibiae have two long apophyses lying contiguous to one another (Figs. 255, 256, 262). The SA terminates in a dark colored point (Figs. 3, 5, 257), which is not visible in the unexpanded palp, and the embolic coil is of medium to large size (Figs. 254,

259). The female epigynum has two forms (Figs. 273-275 and 278-283). This group corresponds with the sub-genus *Cornicularia* (Wunderlich 1972), and is widely distributed throughout the northern hemisphere.

7. *cuspidata* Group (based on *W. cuspidata* Bl.)

The male carapace has a tiny prominence in the ocular area (Figs. 285, 286). The palpal tibia (Fig. 287) is rather similar to those of the *acuminata* group. The SA has a short trunk-like extension distally (Fig. 7), and the embolic coil is fairly large in diameter (Fig. 284). The female epigynum (Fig. 288) is quite distinct from those of the other groups, and the internal ducts follow a different pathway (Fig. 290). This group contains a single species (with the N. American population regarded here as a subspecies), and corresponds with the subgenus *Heteroprosopotheca* Wunderlich. The distribution is holoarctic.

8. *atrotibialis* Group (based on *W. atrotibialis* O.P.-Cambridge)

The male carapace has a shallow lobe anteriorly, and the clypeus is strongly projecting (Fig. 293). The palpal tibia has two apophyses of approximately equal size (Fig. 294). The SA terminates in a short point, not visible in the unexpanded palp, and the embolic coil is rather small in diameter (Fig. 292). The epigynum (Fig. 295) is characteristic, and the internal ducts follow a course reminiscent of that in *W. cuspidata*. This group comprises a single species, and corresponds with the subgenus *Parawideria* of Wunderlich. The distribution is holarctic.

9. *antica* Group (based on *W. antica* [Wider])

The male carapace has a lobe or lobes anteriorly. The palpal tibia has two apophyses, the lateral being of rounded form. The SA ends in a blunt point, and the embolic coil is of medium size. The female epigynum and the internal genitalia are of fairly distinctive appearance (Figs. 298, 300) (see also Wunderlich 1972, and Kronestedt 1980). This group corresponds with the subgenus *Wideria* (Wunderlich 1972). The group is widely distributed in Europe and probably Asia, but *W. fraudatrix* is the first species of the group to be recorded from N. America.

The genus *Walckenaeria* in N. America presents some interesting taxonomy, with the differences between the species often small, and sometimes not visible in the female by external examination of the spider. The common species *W. spiralis* auct. is a complex of at least three sibling species *(W. spiralis, W. subspiralis* and *W. microspiralis)*, which have identical palpal organs and which can be distinguished in the female only by the form of the internal genitalia (see *W. spiralis* diagnosis). Previous records for *W. spiralis* are consequently unreliable. The *acuminata* group of species has undergone vigorous speciation in N. America, and in addition to the *W. spiralis* siblings the group contains many other closely related species (usually identified as *"W. spiralis"* in the collections) which can be distinguished in the female sex only by examination of the internal genitalia.

In the *directa* species group, *W. directa* and its sibling *W. subdirecta* cannot be distinguished by their genitalia, but only by the spacing of the striae of the cheliceral file (see *W. directa* diagnosis). The differences in the file are perfectly clear (Figs. 308-311), and although there are small variations in this character, as in most others, there is no overlap between the two species, which on a few occasions have been sympatric. Previous records for *W. directa* must also be regarded as unreliable. A similar situation exists with the two species *W. pallida* and *W. subpallida.* The common species *W. communis*, on the other hand, has the spacing of the cheliceral striae more or less constant over the whole geographical range of the species, and no siblings have been detected. van Helsdingen (1963:

35) drew attention to the differences in the cheliceral files of several closely related *Lepthyphantes* species, and it has been suggested that the differing files may play some part in species isolation (van Helsdingen, Thaler and Deltshev 1977:45). The pattern of vibrations produced by rapid movement of the palpal femur along the file would be dependent on the spacings of the file, and the wave-form ("tune") of the vibrations could serve as a recognition code between the sexes prior to mating.

Distribution and natural history.—The genus *Walckenaeria* is distributed throughout the whole of the northern hemisphere, with records from beyond the arctic circle to the equator. In the East African mountains the genus extends marginally below the equator, but I know of no other certain records from the southern hemisphere. The distribution maps given for the species in this paper are based only on the material actually examined, that is, published records have been ignored unless I have seen the specimens. As with distribution maps from other countries, it must be accepted that the maps often tend to reflect the distribution of collecting arachnologists (past and present) and of favoured collecting areas rather than the true range of the species. As with most erigonines, the *Walckenaeria* species live mostly at ground level, often in damp situations, though some, as adults, may move up into low shrubs. The habitats given under the species descriptions are limited in most instances to those recorded in the vials examined.

DESCRIPTION OF THE SPECIES

The species are described in the order given in Tables 1-3. All figures of palps are of the right palp, unless stated to the contrary. The holotypes of the new species are deposited in AMNH, CNC or MCZ, as given under the species description.

acuminata Group

This group contains a large number of species, which in most instances can be distinguished only by their genitalia. Because of the small differences which sometimes separate the species, it has not been possible to devise keys which are wholly satisfactory or wholly reliable, particularly for females.

Partial keys to the species

Males

1. Carapace with large lobe (Fig. 98) . . . . . *capito*
   Carapace with small lobe (Fig. 113) . . . . . *castanea*
   Carapace with no lobe 2

2. Palpal tibia with small lateral apophysis (Figs. 72, 87-90) 3
   Palpal tibia without a lateral apophysis 4

3. Palpal tibia as Fig. 72 . . . . . *redneri*
   Palpal tibia as Figs. 87-90 . . . . . .
   . . . . . *dixiana, floridiana, digitata, maesta, mexicana* (see species descriptions)

4. Carapace bright orange, abdomen pale; southern species (Mexico) 5
   Color less striking 6

5. Palpal tibia Fig. 82. . . . . *aenea*
   Palpal tibia Figs. 76, 81 . . . . . *gertschi*
   Palpal tibia Figs. 80, 83, 85, 96 . . . . . *iviei, rutilis, crocea* (see species descriptions)

6. Embolic coil very large; SA with "hook" anteriorly (Fig. 8); palpal tibia Fig. 67 . . . . . *spiralis, subspiralis, microspiralis,* (see species descriptions)
   Embolic coil less large 7

7. Embolic coil slightly smaller than in *spiralis*; SA with notch but no "hook" anteriorly (Fig. 55) . . . . . *pellax*
   Embolic coil smaller than in Fig. 55 8

8. Embolic coil moderately large (Figs. 57, 59). *fallax, subvigilax* (see species descriptions)
   Embolic coil somewhat smaller (Figs. 10, 12, 65) 9

9. Carapace, sternum and legs fairly bright orange and brown; distribution southern (Mexico) . . . . . *rufula*
   Carapace less brightly colored; distribution northern or western . . . . . *arctica, saniuana* (see species descriptions)

Table 1.–N. American *Walckenaeria* species: *acuminata* species group. The species are described in the text in the order given.

W. spiralis (Emerton)
W. subspiralis, new species
W. microspiralis, new species
W. arctica, new species
W. saniuana (Chamberlin and Ivie), new combination
W. latens, new species
W. arcana, new species
W. pullata, new species
W. discolor, new species
W. faceta, new species
W. pellax, new species
W. fallax, new species
W. subvigilax, new species
W. iviei, new species
W. rutilis, new species
W. rufula, new species
W. crocea, new species
W. gertschi, new species
W. aenea, new species
W. capito (Westring)
W. redneri, new species
W. clavipalpe, new species
W. castanea (Emerton), new combination
W. dixiana (Chamberlin and Ivie), new combination
W. floridiana, new species
W. digitata (Emerton), new combination
W. maesta, new species
W. aurata, new species
W. mexicana, new species
W. puella, new species
W. blanda, new species

Females

1. Carapace distinctly raised anteriorly (Fig. 101); epigynum Fig. 93 ..... *capito*
   Carapace not significantly raised. 2

2. Palpal tibia/tarsus distinctly swollen (Fig. 118); epigynum Fig. 95 ..... *clavipalpe*
   Palpal tibia/tarsus not of this form 3

3. Brightly colored spiders, with carapace bright orange, abdomen grey to white, legs orange/brown; southern species (Mexico). 4
   Spiders less strikingly colored 5

4. Epigyna Figs. 37, 38 ..... *iviei, rutilis* (see species descriptions)
   Epigynum Fig. 91 ..... *gertschi*
   Epigynum Fig. 92 ..... *aenea*

5. Epigynum Fig. 94 ..... *redneri*
   Epigynum Fig. 96 ..... *castanea*
   Epigynum not as Figs. 94, 96. 6

6. Epigynum relatively simple, with internal ducts not visible (Figs. 33, 127-132) .....
   . . *dixiana, floridiana, digitata, maesta, aurata, puella, pullata* (see species descriptions)
   Epigynum with ducts visible in central area, both anterior and posterior to the spermathecae (Figs. 14-21, 34-38). Note: occasionally in dark colored specimens of *spiralis* and its siblings the ducts are scarcely if at all visible 7

7. Epigynum Fig. 35 ..... *blanda*
   Epigynum not as Fig. 35. 8

8. Species with distinctly southern distributions (e.g. Mexico). .....
   ..... *arcana, discolor, faceta* (see species descriptions)
   Species with distributions mainly northern and/or western .....
   . . *spiralis, subspiralis, microspiralis, arctica, saniuana, latens* (see species descriptions)

Walckenaeria spiralis (Emerton)

Figs. 2, 4, 8, 9, 14, 15, 16, 22, 23, 28, 67, 109, 112; Map 1

Spiropalpus spiralis Emerton 1882:39.
Cornicularia spiralis: Roewer 1942:664.
Walckenaera vigilax: Crosby and Bishop 1931:378; Kaston 1948:206 (misidentification: *nec Neriene vigilax* Blackwall).
Cornicularia vigilax: Bonnet 1956:1227 (misidentification).
Walckenaera spiralis: Dondale and Redner 1972:1644.

This species was confused with *W. vigilax* (Blackwall) by Crosby and Bishop (1931) and some subsequent authors; this error was pointed out by Fage (1938:373) and corrected by Dondale and Redner (1972). *W. spiralis* has not previously been differentiated from *W. subspiralis, W. microspiralis* and some other closely related species; hence most previous records for *W. spiralis* are suspect.

Type.–Two female and two male syntypes from New Haven, Connecticut, October 1881; in Emerton Collection, MCZ, examined.

Table 2.–N. American *Walckenaeria* species: *directa, tibialis* and *tricornis* species groups. The species are described in the text in the order given.

directa group	
	W. directa (O. P.-Cambridge)
	W. subdirecta, new species
	W. communis (Emerton)
	W. breviaria (Crosby and Bishop)
	W. pallida (Emerton)
	W. subpallida, new species
	W. prominens, new species
	W. indirecta (O. P.-Cambridge)
	W. oregona, new species
	W. dondalei, new species
	W. brevicornis (Emerton)
	W. carolina, new species
tibialis group	
	W. tibialis (Emerton)
	W. tumida (Crosby and Bishop)
	W. teres, new species
tricornis group	
	W. tricornis (Emerton)
	W. palustris, new species
	W. aprilis, new species
	W. solivaga, new species
	W. anceps, new species
	W. bifida, new species
	W. serrata, new species
	W. weber (Chamberlin), new combination
	W. occidentalis, new species
	W. helenae, new species
	W. reclusa, new species
	W. septentrionalis, new species
	W. columbia, new species

Description.–Total length: female 2.0-2.6 mm, male 1.9-2.2 mm. Carapace: length: female 0.9-1.0 mm, male 0.85-0.95 mm. Orange-brown to brown, often darkened anteriorly; male carapace not raised behind the eyes (Fig. 109). Chelicerae: the lateral striae are moderately widely spaced in both sexes. Abdomen: black. Sternum: orange-brown, suffused with black particularly on margins. Legs: orange to orange-brown. TmI: female 0.55-0.58, male 0.50-0.55. Male palp: Figs. 2, 4, 8, 9. 67; the embolic coil is large, and the SA has a distinct hook-like projection anteriorly. Epigynum: Figs. 14, 15, 16. Externally the appearance is variable, depending on the transparency of the integument; sometimes the spermathecae are only faintly visible, while occasionally the internal structure is much clearer (Fig. 16). Internally, the duct leaves the spermatheca via a double spiral (Fig. 23) inside a dark colored screw-shaped extension of the spermatheca (Fig. 28); thereafter the duct (observable after clearing the epigynum) follows an irregular serpentine course, probably along the margins of a twisted lamella, to the external opening (Fig. 22).

Diagnosis.–Males of *W. spiralis* and *W. subspiralis*, which are structurally indistinguishable, are diagnosed by the large diameter of the embolic coil (Fig. 8), coupled with the form of the SA, which has a hook-like projection anteriorly. The palp of *W. spiralis* is also indistinguishable from that of *W. microspiralis*, and males of *W. spiralis/subspiralis* can be

Table 3.–N. American *Walckenaeria* species: *minuta, unicornis, cuspidata, atrotibialis* and *antica* species groups. The species are described in the text in the order given.

minuta group	
	W. minuta (Emerton)
	W. exigua, new species
	W. tenella, new species
	W. thrinax (Chamberlin and Ivie)
	W. cornuella (Chamberlin and Ivie), new combination
	W. monoceras (Chamberlin and Ivie)
	W. pinocchio (Kaston)
	W. placida (Banks)
	W. emarginata, new species
unicornis group	
	W. auranticeps (Emerton)
	W. ledpia (Kulczynski)
	W. fusciceps, new species
	W. clavicornis (Emerton)
	W. holmi, new species
cuspidata group	
	W. cuspidata brevicula (Crosby and Bishop), new status
atrotibialis group	
	W. atrotibialis O. P.-Cambridge
antica group	
	W. fraudatrix, new species

distinguished from *W. microspiralis* only by a difference in the value of TmI (0.50-0.55 for *W. spiralis/subspiralis*, cf. 0.65 for *W. microspiralis*); it is not certain that this difference is constant. The carapace of *W. microspiralis* is slightly more raised behind the eyes than in *W. spiralis* (Fig. 110 cf. Fig. 109), but the difference is small and probably not reliable for diagnosis. The epigynum of *W. spiralis* (Figs. 14, 15, 16) can be similar to that of several other species in this group, and the form of the internal genitalia offers the only reliable means of diagnosis. The spermathecae have a long screw-like extension (Fig. 28), inside which the duct follows a double spiral path of 3-4 turns in each direction (Fig. 23); this character distinguishes *W. spiralis* from all other *Walckenaeria* species. The form of the spermathecal extension can be seen without clearing, by lifting the epigynum and observing the dorsal side thus exposed (Fig. 28); this is the simplest way to diagnose the species. In occasional specimens the long spermathecal extensions are visible through the integument when the epigynum is examined ventrally (Fig. 16). In *W. subspiralis* the extension of the spermatheca is of similar type, but shorter (Figs. 29, 31), and the double spiral path has fewer turns (Figs. 26, 27). In *W. microspiralis* and *W. latens* the spermathecal extension and the duct spiral are even shorter (Figs. 30, 32; 41, 48), and the duct pathway after leaving the extension is somewhat shorter and simpler (Figs. 26, 41). *W. spiralis* female is readily distinguishable from *W. arctica* and *W. saniuana* (which are grouped with it in the key) by the form of the spermathecal extension.

Distribution.–*W. spiralis* is widely distributed throughout N. America (Map 1), but appears to be absent from the western coastal area, where it is replaced by *W. subspiralis.* The records mapped are based exclusively on females, since unaccompanied males cannot be distinguished from *W. subspiralis*, and possibly from *W. microspiralis.*

Natural History.—Adult females have been taken from March to November, males from May to October. The species has been taken in a variety of habitats: in meadows, in tall grass and weeds, in sphagnum fen, on beach dunes, at the edge of woods, and by beating bushes.

Walckenaeria subspiralis, new species
Figs. 24, 26, 27, 29, 31; Map 2

Type.—Holotype female from 9 mi. south-west of Tule Lake, Siskiyon Co., California, 15 September 1965 (J. and W. Ivie); deposited in AMNH.

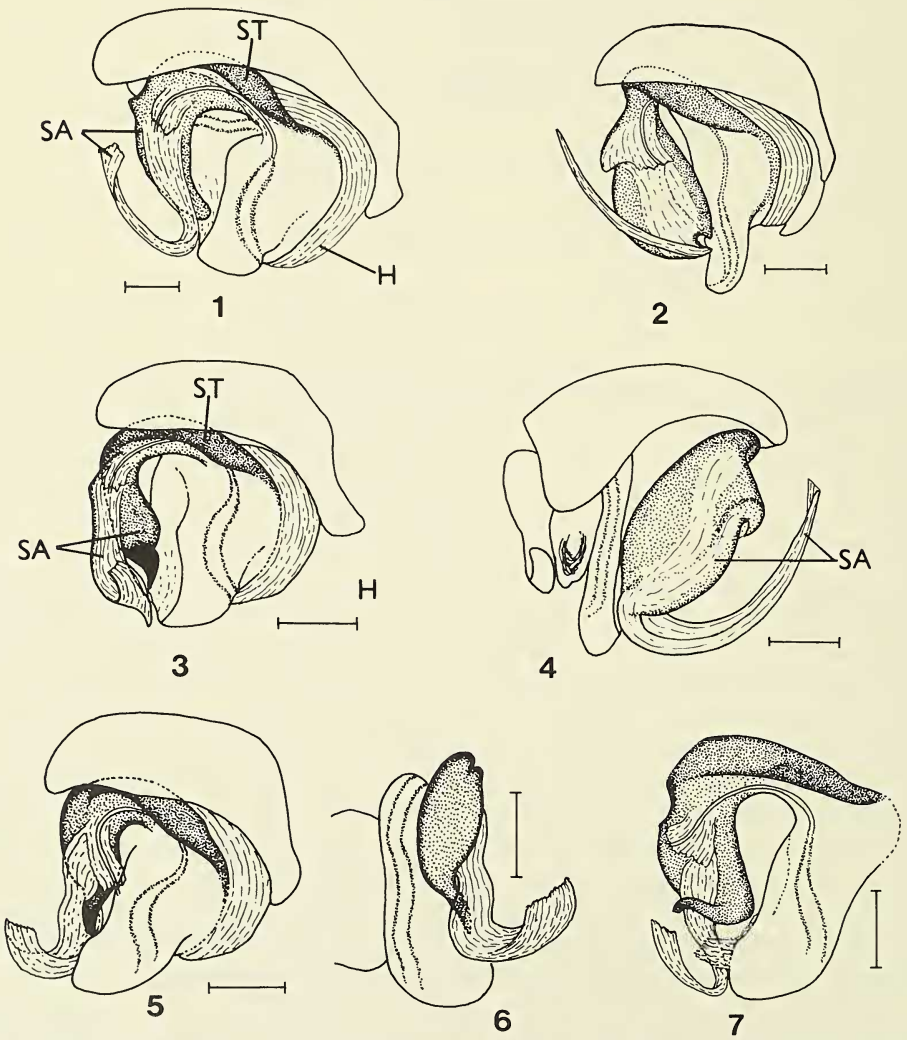
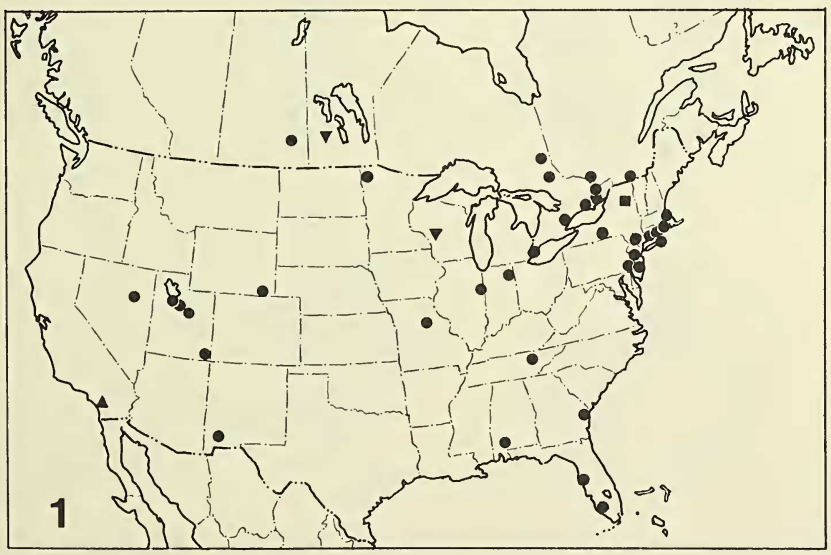


Fig. 1-7.—Male palpal organs, with ED removed, 1, *W. acuminata*, mesal; 2, *W. spiralis*, mesal; 3, *W. unicornis*, mesal; 4, *W. spiralis*, ectal; 5, *W. clavicornis*, mesal; 6, *W. clavicornis*, ectal; 7, *W. cuspidata*, mesal. Abbreviations: SA, suprategular apophysis; ST, suprategulum (Scale lines 0.1 mm).

Description.–Total length: female 2.1-2.9 mm, male 1.9-2.3 mm. Carapace: length: female 0.9-1.1 mm, male 0.9-1.0 mm. In color and most characters this species seems to be identical with *W. spiralis*. Male palp: not distinguishable from that of *W. spiralis*. Epigynum: externally not distinguishable from that of *W. spiralis*, except in occasional specimens where the form of the spermathecal extensions is visible through the integument. Internally the duct leaves the spermatheca via a double spiral of 2-3 turns in each direction (Fig. 26) inside the screw-like, dark colored extension (Figs. 29, 31); thereafter (Fig. 24) the duct follows a similar course to that in *W. spiralis*. In a few specimens, which are assumed to be of the same species, the wall of the spermathecal extension is much less evident, and after clearing is more or less invisible (Fig. 27).

Diagnosis.–The male of *W. subspiralis* is structurally indistinguishable from *W. spiralis*, and is distinguishable from *W. microspiralis* only by the value of TmI (see *W. spiralis* diagnosis). The epigynum of *W. subspiralis* is in most instances indistinguishable from that of *W. spiralis* and several other species, and the female must be diagnosed by the internal genitalia. The form of the squat beehive-shaped extension of the spermatheca (Figs. 29, 31) is distinctive: this is shorter than in *W. spiralis* (Fig. 28), and the double spiral pathway of the duct inside this extension is also shorter (Fig. 26 cf. Fig. 23), but longer than in *W. microspiralis* (Figs. 30, 32). The female can usually be diagnosed without difficulty in the same way as with *W. spiralis*, by lifting the epigynum and observing the dorsal side (Fig. 29). *W. subspiralis* female is readily distinguished from *W. arctica, W. saniuana* and *W. latens* (which are associated with it in the key) by the form of the spermathecal extension and of the double spiral pathway of the duct within the extension.

Distribution.–This species has been taken widely throughout N. America (Map 2: based on females), though there are more records from the west than from the east. The distribution appears somewhat discontinuous, but the structural differences between the eastern and western populations are too small to justify regarding these as separate species.



Map 1.–North America. Distributions of *W. spiralis* (circles), *W. saniuana* (triangle), *W. redneri* (inverted triangles) and *W. clavipalpe* (square).

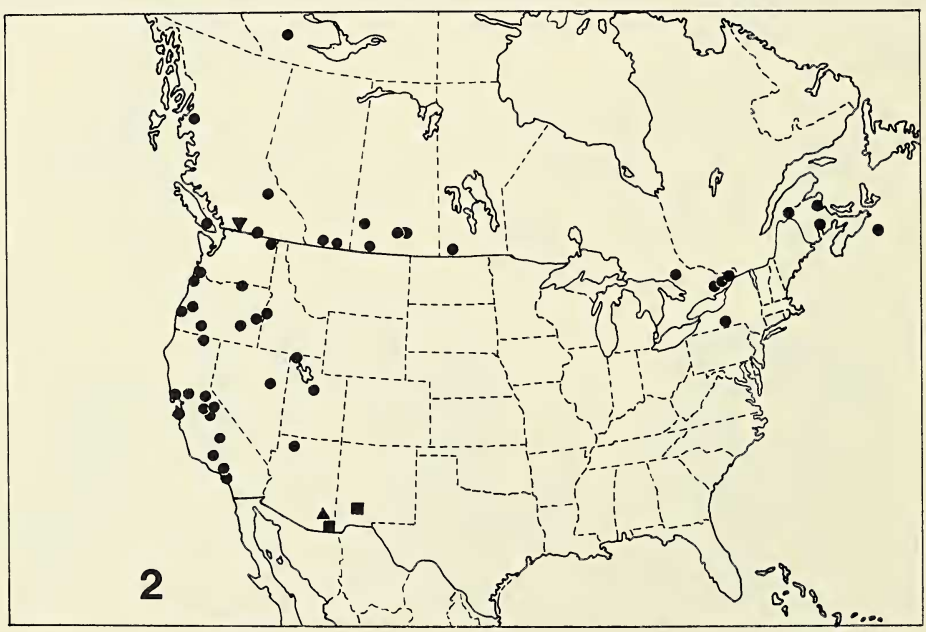
Natural History.–Adult females have been taken from March to December, males from June to November. This species has been recorded from a variety of habitats: e.g. in grass, in leaf litter, in sphagnum, in cracks in dried mud, on a rocky lake shore, under logs, in a soil sample and by sweeping low vegetation.

Walckenaeria microspiralis, new species
Figs. 17, 25, 30, 32, 110; Map 7

Type.–Holotype female from Richmond, Ontario, 12-27 July 1978, pitfalls in calcareous bog (Dondale and Redner); deposited in CNC.

Description.–The two sexes were taken together. Total length: female 3.1-3.3 mm, male 2.45 mm. This species is colored more or less the same as *W. spiralis*. Carapace: length: female 1.30-1.35 mm, male 1.0 mm. The male carapace is slightly raised behind the eyes (Fig. 110), but this character shows some variation. Legs: TmI: female 0.70-0.75, male 0.65. Chelicerae: in the female the lateral striae are more closely spaced than in *W. spiralis*, while in the male they are rather more widely spaced. Male palp: identical with that of *W. spiralis*. Epigynum: Fig. 17; externally the spermathecae appear very dark in color, but whether this is a constant character is uncertain. Internally, the duct leaves the spermatheca via a short double spiral of about one turn in each direction (Fig. 30) inside the squat, dark colored screw-like extension (Fig. 32)? thereafter the duct follows a shorter, rather more regular route (Fig. 25) than in *W. spiralis* or *W. subspiralis*.

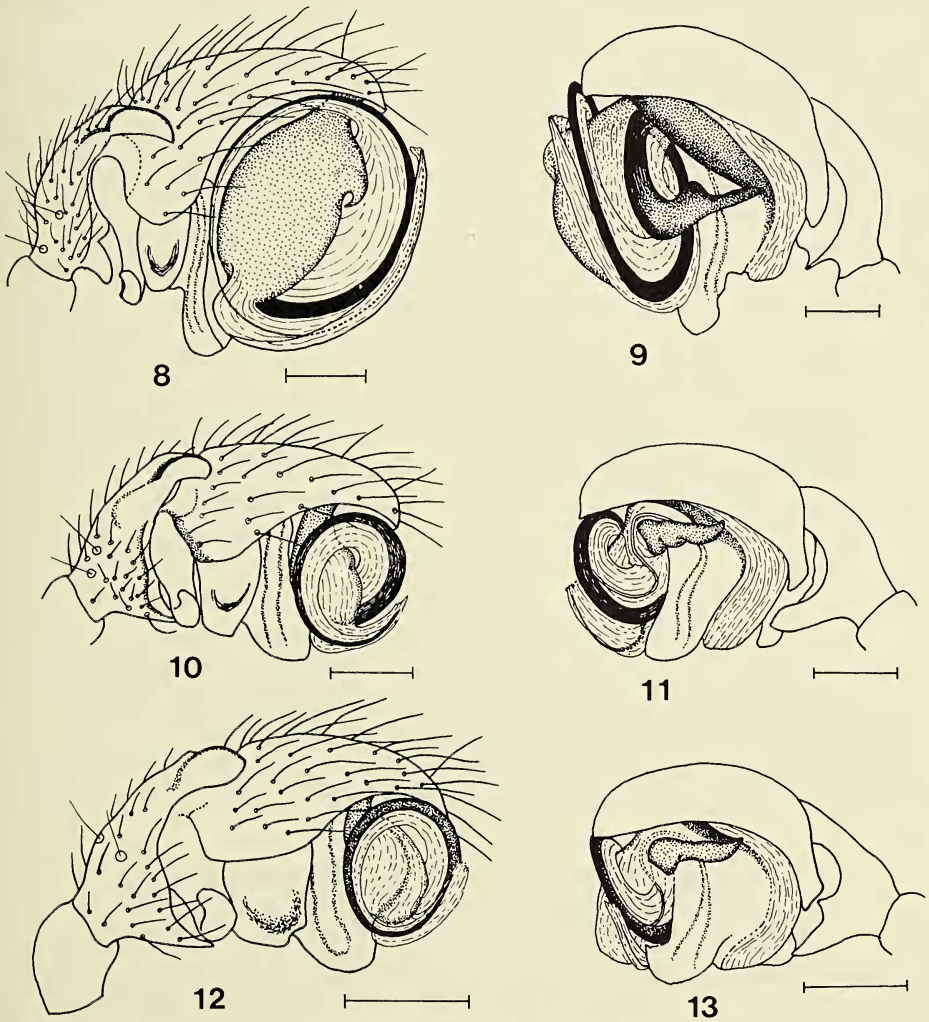
Diagnosis.–The male of *W. microspiralis* appears to be distinguishable from *W. spiralis* and *W. subspiralis* only by the higher value of TmI (0.65 cf. 0.50-0.55), though examination of more specimens may show that this difference is not always reliable. The female



Map 2.–North America. Distributions of *W. subspiralis* (circles), *W. latens* (triangle), *W. pellax* (inverted triangles) and *W. blanda* (squares).

can possibly be distinguished from *W. spiralis* and *W. subspiralis* by the epigynum (Fig. 17), but a more reliable diagnosis is based on the form of the spermathecal extension (Fig. 32), in which the duct follows a double spiral path of about one turn in each direction (Fig. 30). The epigynum and internal genitalia of *W. microspiralis* are similar to those of *W. latens* (Figs. 20, 41); the spermathecae in *W. latens* are differently shaped, however, and the pathway of the duct after leaving the spermathecal extension is longer and more complex in *W. microspiralis* than in *W. latens*. In addition, the value of TmI in *W. microspiralis* (0.70) is much higher than in *W. latens* (0.50), and the geographical distributions of the two species is different. *W. microspiralis* is readily distinguished from *W. saniuana* and *W. arctica* (which are associated with it in the key) by the form of the spermathecal extension (Fig. 32 cf. Fig. 46). *W. microspiralis* female is also rather similar to *W. pullata:* see *W. pullata* diagnosis.

Distribution.–This species is known only from a small area of the eastern part of N. America (Map 7: based on females).



Figs. 8-13.–Male palps. 8, *W. spiralis*, ectal; 9, *W. spiralis*, mesal; 10, *W. arctica*, ectal; 11, *W. arctica*, mesal; 12, *W. saniuana*, ectal; 13, *W. saniuana*, mesal (Scale lines 0.1 mm).

Natural History.—Females were taken adult in June to August, males in June-July. The species has been recorded from boggy areas, and on a beach.

Walckenaeria arctica, new species
Figs. 10, 11, 18, 39, 46, 68; Map 7

Type.—Holotype male from Wrigley, Northwest Territories, Canada, 6-12 June 1969 (G. E. Shewell); deposited in CNC.

Description.—The female described was taken at the type locality within a few days of the male. Total length: female 2.2-2.3 mm, male 1.80-1.85 mm. Carapace: length: female 0.90 mm, male 0.80 mm. Chestnut-brown, with margins darkened. Chelicerae: lateral striae less widely spaced in both sexes than in *W. spiralis*. Abdomen: grey to black. Sternum: orange brown to deep brown, with darkened margins. Legs: orange-brown to brown. TmI: female 0.46-0.50, male 0.44-0.48. Male palp: Figs. 10, 11, 68. Epigynum: Figs. 18, 39, 46.

Diagnosis.—*W. arctica* male is diagnosed by the palp (Figs. 10, 11), which has the embolic coil of medium size. The species with which confusion is most likely is *W. saniuana*; the notch on the anterior margin of the SA in *W. arctica* is more pronounced than in *W. saniuana* (Fig. 10 cf. Fig. 12), and the cheliceral striae are significantly more closely spaced in *W. arctica*. In addition, the palpal tibia of *W. arctica* has three trichobothria, whereas *W. saniuana* has only two (Fig. 68, cf. Fig. 69), and the geographical distributions of the two species are different. The female of *W. arctica* has the epigynum (Fig. 18) very similar to those of *W. spiralis* and several other species, and the diagnosis must be based on the internal genitalic structure (Figs. 39, 46). In *W. arctica*, the passage of the duct through the spermathecal extension is a smooth curve rather than a double spiral as is *W. spiralis, W. subspiralis, W. microspiralis* and *W. latens*. The epigynum and internal genitalia are very close to those of *W. saniuana* (Fig. 19) and *W. arcana* (Figs. 21, 40, 47). From these two species *W. arctica* is separated by the much closer spacing of the cheliceral striae; recourse must also be made to the geographical distribution, which for *W. arctica* is northern, and for *W. saniuana* and *W. arcana* is western and southern. Although the epigyna of *W. arctica* and *W. pullata* (Fig. 33) are probably distinguishable, the internal genitalia of these two species show fairly close similarities (Figs. 39, 42); the spermathecal extensions are however somewhat differently shaped (Fig. 46 cf. Fig. 49), and the duct pathway anterior to the spermatheca is more complex in *W. pullata*.

Distribution.—*W. arctica* is known only from a few localities in the north of the continent: New Hampshire, Alberta and Northwest Territories (Map 7).

Natural History.—Adult females have been taken in June and September, males in May-June and August. The only habitat recorded is in grass at the edge of a poplar wood.

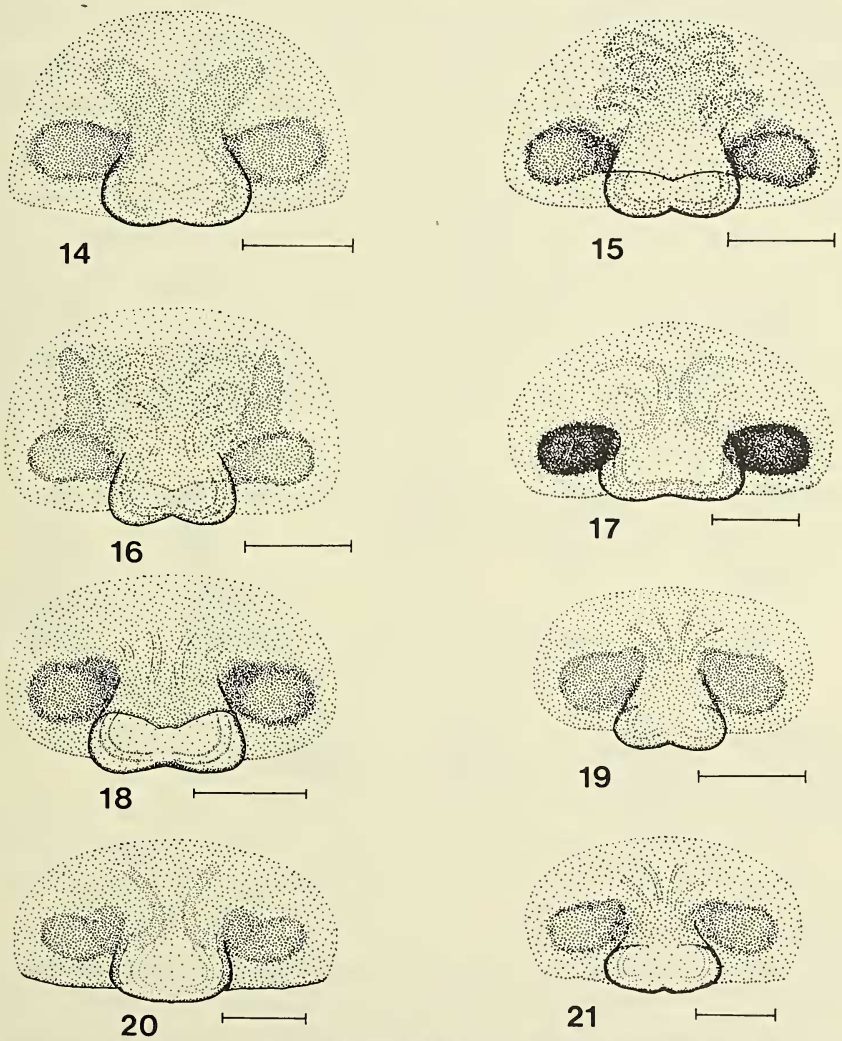
Walckenaeria saniuana (Chamberlin and Ivie), new combination
Figs. 12, 13, 19, 69; Map 1

Sisis saniuana Chamberlin and Ivie 1939:66; Roewer 1942:650; Bonnet 1958:4066.

Type.—Male type (labelled "Sisis A type") from San Juan Creek, Orange Co., California, 3 July 1931 (R. V. Chamberlin); in AMNH, examined. I have labelled this specimen as the holotype of *Sisis saniuana* Chamberlin and Ivie.

Description.–The female described was taken at the type locality two days before the type. Total length: female 2.0 mm, male 1.6 mm. Carapace: length: female 0.9 mm, male 0.7 mm. Brown, somewhat darkened anteriorly. Chelicerae: lateral striae widely separated in both sexes. Abdomen: grey-black. Sternum: brown, suffused with black. Legs: yellow-brown. TmI: female 0.53, male 0.50. Male palp: Figs. 12, 13, 69; the tibia has two trichobothria dorsally. Epigynum: Fig. 19: the internal genitalia are practically identical (apart from size) with those of *W. arcana* (Figs. 40, 47).

Diagnosis.–The male of *W. saniuana* is closely similar to *W. arctica*, and its diagnosis is dealt with under that species. The epigynum of *W. saniuana* (Fig. 19) is similar to those of other species in this group, and particularly to those of *W. arctica* (Fig. 18) and *W. arcana* (Fig. 21). From *W. arctica* it is separated by the much wider spacing of the cheliceral striae and the geographical distribution (see *W. arctica* diagnosis). From *W. arcana* it can be distinguished by the much larger size of the latter, by the proportions of



Figs. 14-21.–Epigyna. 14-16, *W. spiralis*; 17, *W. microspiralis*; 18, *W. arctica*; 19, *W. saniuana*; 20, *W. latens*; 21, *W. arcana* (Scale lines 0.1 mm).

the legs (MT I/tI 1.4, tibia I l/d ca. 4, cf. corresponding figs. of 1.7 and 5 for *W. arcana*), and possibly by the geographical distribution.

Distribution.—Known only from the type locality (Map 1).

Natural History.—Both sexes were adult in July; nothing was recorded on habitat.

Walckenaeria latens, new species
Figs. 20, 41, 48; Map 2

Type.—Holotype female from Heliograph Peak, Pinaleno Mts., Graham Co., Arizona, 29 August 1951 (T. Cohn); deposited in AMNH.

Description.—Only the female is known. Total length: female 3.3 mm. Carapace: length: female 1.2 mm. Chestnut-brown, with darker markings and margins. Chelicerae: lateral striae moderately widely spaced. Abdomen:black. Sternum: brown, reticulated with black. Legs: orange. TmI: female 0.50. Epigynum: Figs. 20, 41, 48.

Diagnosis.—The epigynum of *W. latens* (Fig. 20) is very similar to those of *W. spiralis* and several other species; consequently diagnosis must be based on the internal genitalia. The extension of the spermatheca (Fig. 48) and the short spiral pathway of the duct within the extension (Fig. 41) are very like those of *W. microspiralis* (Figs. 25, 30); for the distinguishing characters, see *W. microspiralis* diagnosis. *W. latens* is distinguished from *W. arctica* and *W. saniuana* (which are associated with it in the key) by the internal genitalia (see *W. arctica* diagnosis). The epigynum of *W. latens* is similar to that of *W. arcana* (Fig. 21); these two species are distinguished by the different forms of the spermathecal extension (Fig. 48 cf. Fig. 47), and by the spiral route of the duct in the extension in *W. latens* (Fig. 41, cf. Fig. 40). *W. latens* also has slimmer legs than *W. arcana*, with tibia I l/d 7.5-8 in *W. latens*, 5 in *W. arcana*, and the geographical distributions of the two species is probably different.

Distribution.—Known only by the type specimen (Map 2).

Natural History.—The single female was adult in August. Nothing was recorded on habitat, but possibly it is a montane species.

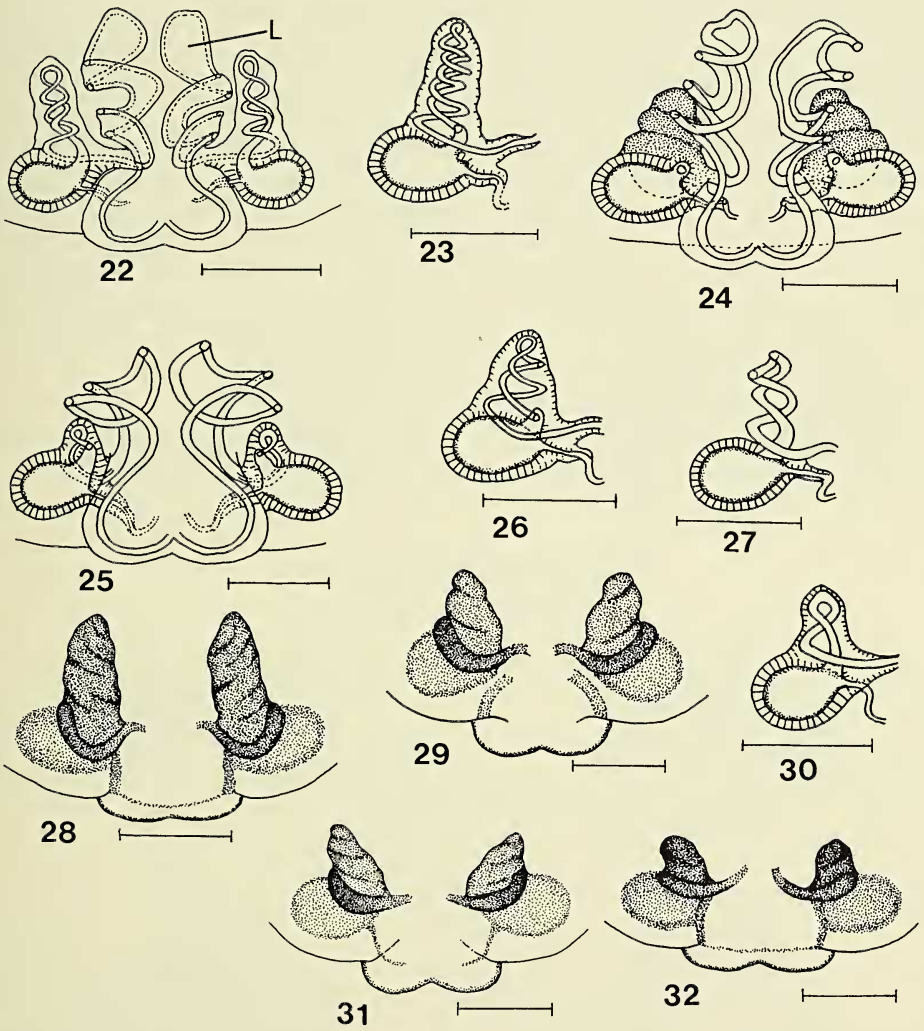
Walckenaeria arcana, new species
Figs. 21, 40, 47; Map 5

Type.—Holotype female from Laguna de Labradores, Galeana, Nuevo Leon, Mexico, 18 July 1942 (Bolivar, Bonet, Osorio, Pelaez); deposited in AMNH.

Description.—Only the female is known. Total length: female 3.3 mm. Carapace: length: female 1.2 mm. Orange-brown with dusky markings. Chelicerae: lateral striae widely spaced. Abdomen: grey. Sternum: orange, suffused with black, particularly on margins. Legs: orange. TmI: female 0.53-0.57. Epigynum: Figs. 21, 40, 47.

Diagnosis.—The epigynum of *W. arcana* (Fig. 21) is very similar to those of *W. spiralis* and its siblings, and particularly to those of *W. arctica* (Fig. 18), *W. saniuana* (Fig. 19) and *W. latens* (Fig. 20). Internally, the spermathecal extension and the ducts (Figs. 40, 47) are clearly distinct from those of *W. spiralis, W. subspiralis* and *W. microspiralis*, with the duct pathway within the extension following a smooth curve rather than a spiral. The internal genitalia are very similar to those of *W. arctica* (Figs. 39, 46); the separation of

these two species is based on the cheliceral striae and the geographical distribution (see *W. arctica* diagnosis). *W. arcana* is larger in size than *W. saniuana*, but otherwise very similar: for distinguishing characters, see *W. saniuana* diagnosis. The epigynum of *W. arcana* is also similar to that of *W. latens* (Fig. 20): the distinguishing characters are given under *W. latens* diagnosis. Although the epigyna of *W. arcana* and *W. pullata* (Fig. 33) are probably distinguishable their internal genitalia are rather similar (Figs. 40, 42); the spermathecal extensions are however rather differently shaped (Fig. 47 cf. Fig. 49), and the duct pathway after leaving the extension is more complex in *W. pullata*. See also *W. discolor* and *W. faceta* diagnoses.



Figs. 22-32.–Female genitalia, internal. 22, *W. spiralis*, cleared, ventral; 23, *W. spiralis*, spermatheca, cleared, dorsal; 24, *W. subspiralis*, cleared, dorsal; 25, *W. microspiralis*, cleared, dorsal; 26, *W. subspiralis*, spermathecae, cleared, dorsal; 27, *W. subspiralis*, spermatheca, cleared, dorsal, another specimen (see text); 28, *W. spiralis*, spermathecae, dorsal; 29, *W. subspiralis*, spermathecae, dorsal; 30, *W. microspiralis*, spermathecae, cleared, dorsal; 31, *W. subspiralis*, spermathecae, dorsal, specimen from California; 32, *W. microspiralis*, spermathecae, dorsal. Abbreviation: L, lamella carrying ducts (Scale lines 0.1 mm).

Distribution.—Known only from the type locality in Mexico (Map 5).

Natural History.—The single female was taken adult in July; nothing was recorded on habitat.

Walckenaeria pullata, new species
Figs. 33, 42, 49; Map 11

Type.—Holotype female from Mirror Lake, Uintah Mts., Duchesne Co., Utah, 22 September 1932 (W. Ivie); deposited in AMNH.

Description.—Only the female is known. Total length: female 2.55-2.65 mm. Carapace: length: female 1.0 mm. Deep orange, heavily suffused with chestnut or black. Chelicerae: lateral striae widely spaced. Abdomen: black. Sternum: deep chestnut brown. Legs: deep orange. TmI: female 0.48-0.51. Epigynum: Figs. 33, 42, 49.

Diagnosis.—*W. pullata* can probably be diagnosed by the epigynum (Fig. 33), though this is rather similar to that of *W. microspiralis* (Fig. 17). The identification should always be checked by examination of the internal genitalia; the form of the spermathecal extension (Fig. 49) and the non-spiral pathway of the duct within the extension (Fig. 42) distinguish *W. pullata* from *W. microspiralis* (Figs. 32, 30). The value of TmI for *W. pullata* (0.50) is also much lower than for *W. microspiralis* (0.70). The internal genitalia of *W. pullata* have a similar form to those of *W. arctica* (Fig. 39) and *W. arcana* (Fig. 40): for distinguishing characters, see *W. arctica* and *W. arcana* diagnoses.

Distribution.—Known only from Utah and Alberta (Map 11).

Natural History.—Females were adult in August and September. The habitat recorded in Alberta was in pine litter/red heath mat on an alpine slope at ca. 2000 m.

Walckenaeria discolor, new species
Figs. 34, 43, 50; Map 3

Type.—Female holotype from 2 mi. east of El Salto, Durango, Mexico, 10 July 1964 (E. E. Linquist); deposited in CNC.

Map 3.—Mexico. Distribution of *W. discolor* (circles), *W. iviei* (triangle), *W. faceta* (inverted triangle) and *W. rufula* (square).

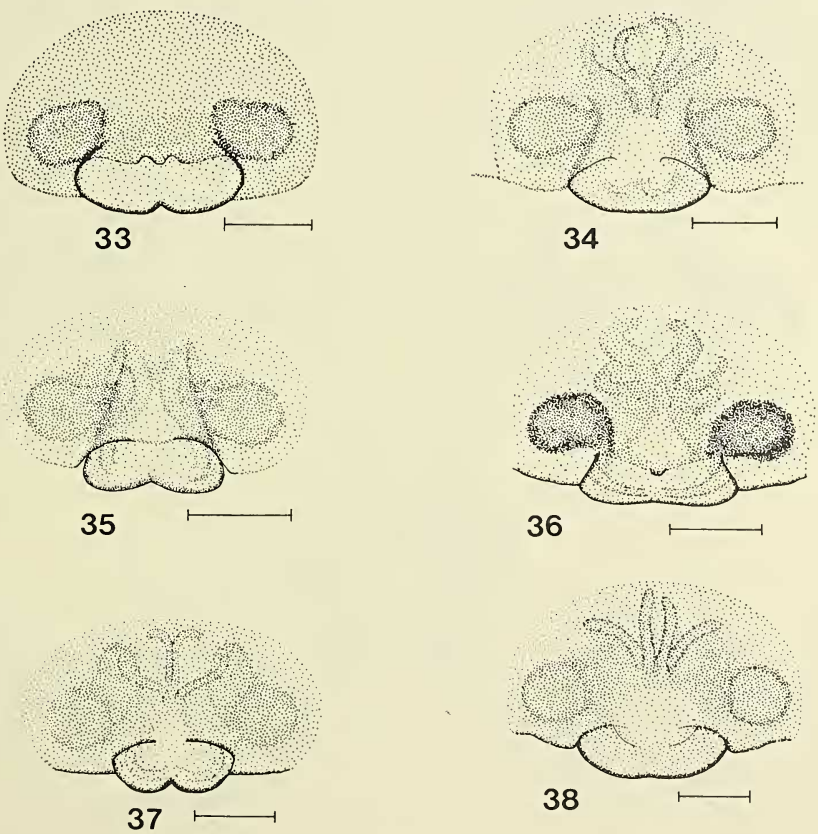
Map 4.—Mexico. Distributions of *W. crocea* (circle), *W. gertschi* (triangles), *W. rutilis* (inverted triangles) and *W. aenea* (square).

Description.–Only the female is known. Total length: female: 2.55-3.10 mm. Carapace: length: female 1.05-1.10 mm. Orange-brown, with faint darker markings. Chelicerae: lateral striae moderately spaced. Abdomen: grey-black, with four pale chevrons dorsally, and a longitudinal white stripe ventrally. Sternum: pale orange, with dusky markings. Legs: orange-brown. TmI: female 0.57. Epigynum: Figs. 34, 43, 50; the ducts are clearly visible anteriorly.

Diagnosis.–The epigynum of *W. discolor* is generally similar to those of *W. iviei* (Fig. 37), *W. rutilis* (Fig. 38), *W. faceta* (Fig. 36) and *W. arcana* (Fig. 21), all of which have a similar geographical distribution to *W. discolor*. The coloration will distinguish *W. discolor* from *W. iviei* and *W. rutilis*, but separation from *W. faceta* and *W. arcana* must be based on the internal genitalia. In *W. discolor* the extension of the spermatheca is distinctly more curved than in *W. faceta* or *W. arcana* (Fig. 43, 50, cf Figs. 44, 51; 40, 47) and the arrangement of the ducts after leaving the extension is simpler than in *W. faceta*. The internal genitalia also serve to prevent any confusion of *W. discolor* with *W. spiralis* and its siblings. The presence in *W. discolor* of the pale colored abdominal chevrons and ventral stripe are confirmatory characters in diagnosis.

Distribution.–Known only from one area in Mexico (Map 3).

Natural History.–Both the known females were adult in July. One habitat recorded was pine duff.



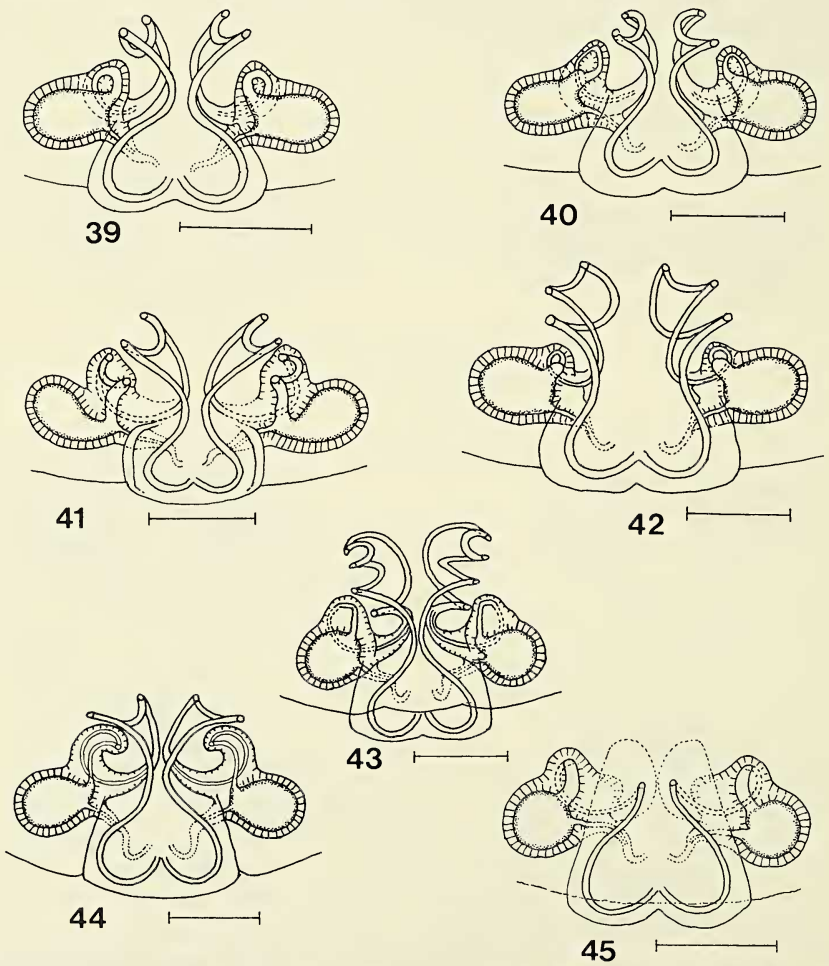
Figs. 33-38.–Epigyna. 33, *W. pullata*; 34, *W. discolor*; 35, *W. blanda*; 36, *W. faceta*; 37, *W. iviei*; 38, *W. rutilis* (Scale lines 0.1 mm).

Walckenaeria faceta, new species
Figs. 36, 44, 51; Map 3

Type.—Female holotype from Volcan Tzontehuitz (altitude 3000 m), 12 mi. N.E. of San Cristobal de las Casas, Chiapas, Mexico, 27 May 1964 (W. M. Campbell); deposited in CNC.

Description.—Only the female is known. Total length: female 2.65 mm. Carapace: length: female 1.1 mm. Brown to dark brown. Chelicerae: lateral striae fairly widely spaced. Abdomen: grey. Sternum: brown. Legs: brown. TmI: female 0.58-0.62. Epigynum: Figs. 36, 44, 51.

Diagnosis.—The epigynum of *W. faceta* (Fig. 36) is generally similar to those of *W. iviei* (Fig. 37), *W. rutilis* (Fig. 38), *W. discolor* (Fig. 34) and *W. arcana* (Fig. 21), all of which have a similar distribution to *W. faceta.* The coloration will distinguish *W. faceta* from *W. iviei* and *W. rutilis*, but separation from *W. discolor* and *W. arcana* is best based on the internal genitalic structure. The principal difference from *W. arcana* lies in the more complicated duct pathway present in *W. faceta* (Fig. 44 cf. Fig. 40); the legs of *W.*



Figs. 39-45.—Female genitalia, cleared, dorsal. 39, *W. arctica*; 40, *W. arcana*; 41, *W. latens*; 42, *W. pullata*; 43, *W. discolor*; 44, *W. faceta*; 45, *W. blanda* (Scale lines 0.1 mm).

faceta are also somewhat stouter, with tibia I l/d 3.5-4 cf. ca. 5 for *W. arcana*. The separation from *W. discolor* is dealt with under that species. The internal genitalia of *W. faceta* also serve to prevent any confusion with *W. spiralis* and its siblings.

Distribution.–Known only from the type locality, where it has been taken on two separate occasions.

Natural History.–The females were adult in May. Habitats recorded were in deciduous leaf litter, and in moss from a log.

Walckenaeria pellax, new species
Figs. 55, 56; Map 2

Type.–Male holotype from Manning Provincial Park, British Columbia, 19 June-4 July 1979 (C. D. Dondale); deposited in CNC.

Description.–Only the male is known. Total length: male 2.3 mm. Carapace: length: male 0.95 mm. Brown, with dusky markings, and with a black blotch on the clypeus below the anterior median eyes. Chelicerae: lateral striae more narrowly spaced than in *W. spiralis*. Abdomen: grey-black. Sternum: brown, suffused with black, particularly on margins. Legs: orange. TmI: male 0.47. Male palp: Figs. 55, 56; the embolic coil is large. The palpal tibia is identical with that of *W. spiralis* (Fig. 67).

Diagnosis.–*W. pellax* is diagnosed by the male palp (Fig. 55), which has the embolic coil larger than that of any species except *W. spiralis* and its siblings; the tegulum is less extended ventrally in *W. pellax* than in *W. spiralis* (Fig. 8), and the small projection on the anterior margin of the SA is less hook-shaped. The tailpiece of *W. pellax* is quite distinct from that of *W. spiralis* (Fig. 56 cf. Fig. 9). *W. pellax* differs from *W. fallax* and *W. subvigilax* by the larger embolic coil (Fig. 55 cf. Figs. 57, 59), and by the shape of the tailpiece (Fig. 56, cf. Figs. 58, 60); the value of TmI is also much lower in *W. pellax* (0.47) than in *W. fallax* (0.65-0.70).

Distribution.–Known only from the type locality (Map 2).

Natural History.–The male was taken adult in June-July, in a pitfall at the edge of a pond.

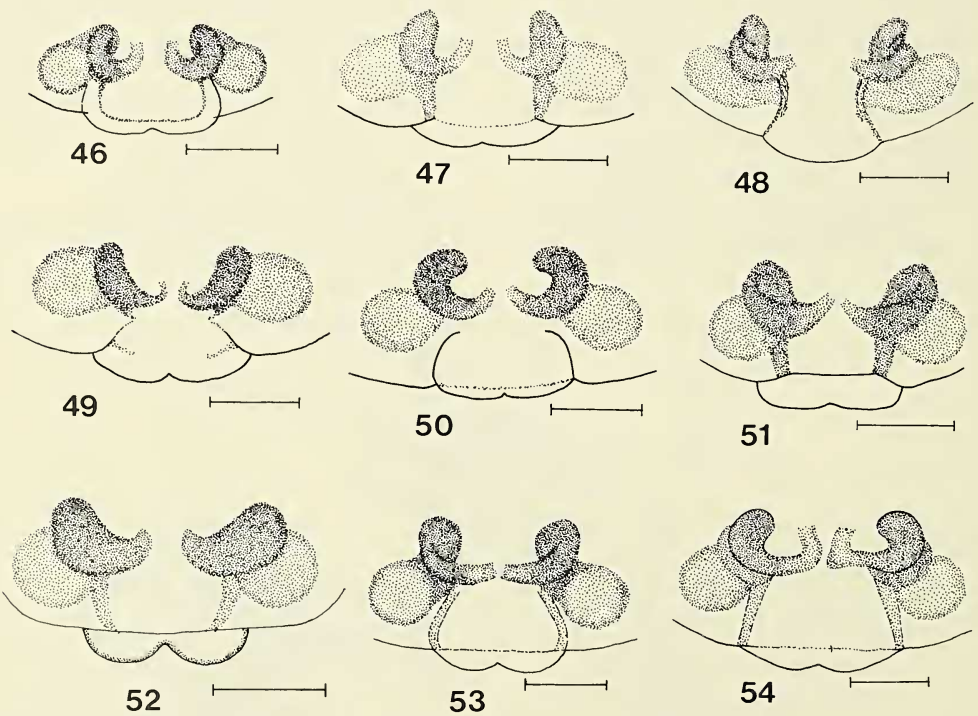
Map 5.–Mexico and Texas. Distribution of *W. mexicana* (circle), *W. puella* (triangle), *W. aurata* (inverted triangle) and *W. arcana* (square).

Walckenaeria fallax, new species
Figs. 57, 58, 71; Map 7

Type.—Male holotype from Poltimore, Quebec, 13 June-5 July 1979 (J. H. Redner); deposited in CNC.

Description.—Only the male is known. Total length: male 2.3-2.45 mm. Carapace: length: male 1.1-1.15 mm. Deep brown, suffused with black anteriorly. Chelicerae: lateral striae fairly closely spaced, much closer than in *W. spiralis*. Abdomen: black. Sternum: brown, with black markings and margins. Legs: brown to deep brown. TmI: male 0.65-0.70. Male palp: Figs. 57, 58, 71; the embolic coil is fairly large. The palpal tibia (Fig. 71) is somewhat different from that of *W. spiralis*.

Diagnosis.—*W. fallax* is diagnosed by the male palp (Fig. 57), which has the embolic coil moderately large, but noticeably smaller than those of *W. spiralis* (Fig. 8) or *W. pellax* (Fig. 55); the tailpiece (Fig. 58) is similar to that of *W. spiralis* (Fig. 9). The only species which have the embolic coil similar in size are *W. subvigilax* (Fig. 59), the European species *W. vigilax* (Fig. 125) and the Mexican species *W. rutilis*. Confusion with *W. rutilis* is impossible because of its much brighter orange color; the tibial apophyses are also rather different in shape (Fig. 71 cf. Fig. 83). *W. subvigilax* and *W. vigilax* lack the small projection present on the anterior margin of the SA in *W. fallax*, and the tailpiece of *W. fallax* (Fig. 58) differs from those of *W. subvigilax* (Fig. 60) and *W. vigilax* (Fig. 126). Additional differences are that *W. fallax* has the cheliceral striae more closely spaced, and a higher value for TmI (0.65-0.70, cf. 0.52 for *W. subvigilax* and 0.50-0.55 for *W. vigilax*).



Figs. 46-54.—Female genitalia, spermathecae, dorsal. 46, *W. arctica*; 47, *W. arcana*; 48, *W. latens*; 49, *W. pullata*; 50, *W. discolor*; 51, *W. faceta*; 52, *W. blanda*; 53, *W. iviei*; 54, *W. rutilis* (Scale lines 0.1 mm).

Distribution.–This species has been taken only in Canada (Quebec, Ontario and Alberta) (Map 7).

Natural History.–Males were adult in June-August. Habitats recorded are in sphagnum, in calcareous bogs and at the edge of deciduous woods (pitfall).

Walckenaeria subvigilax, new species
Figs. 59, 60, 70; Map 11

Type.–Male holotype from Canyon east of Bedford, Lincoln Co., Wyoming, 27 June 1962 (W. Ivie); deposited in AMNH.

Description.–Only the male is known. Total length: male 2.10 mm. Carapace: length: male 0.95 mm. Deep chestnut brown. Chelicerae: lateral striae moderately widely separated. Abdomen: black. Sternum: orange, suffused with black. Legs: orange, with patellae paler. TmI: male 0.52. Male palp: Figs. 59, 60, 70. It is possible, based on geographical distributions, that this is the male of *W. pullata* or *W. latens.*

Diagnosis.–*W. subvigilax* is diagnosed by the male palp (Fig. 59), which has the embolic coil moderately large, more or less as in *W. fallax* (Fig. 57): for the characters distinguishing these two species, see *W. fallax* diagnosis. The Mexican species *W. rutilis*, which has the embolic coil rather similar in size, is distinguished by its much brighter color and by the somewhat different shape of the tibial apophysis (Fig. 83 cf. Fig. 70). *W. subvigilax* is very similar to the European species *W. vigilax* (Fig. 59 cf. Fig. 125), but the tailpiece is longer (Fig. 60 cf. Fig. 126), the embolic coil is slightly larger and the color is more brightly orange.

Distribution.–Known only from the type locality (Map 11).

Natural History.–The male was adult in June: nothing was recorded on habitat.

Walckenaeria iviei, new species
Figs. 37, 53, 61, 62, 80, 102; Map 3

This species is named in honor of W. Ivie, who was responsible for the capture of several new *Walckenaeria* species.

Type.–Male holotype from Garnica Pass summit (9,300 ft.), Mexico, 8 May 1963 (W. J. Gertsch and W. Ivie); deposited in AMNH.

Description.–Both sexes were taken together. Total length: female 2.90 mm, male 2.1-2.3 mm. Carapace: length: female 1.15 mm, male 0.95 mm. Bright orange, with ocular area suffused with black and eyes circled with black. Chelicerae: lateral striae moderately spaced in both sexes. Abdomen: greyish white. Sternum: orange. Legs: femora bright orange, remaining segments yellow-brown to deep brown. TmI: female 0.53, male 0.50. Male palp: Figs. 61, 62, 80; orange, with tibial apophysis deep brown distally. Epigynum: Figs. 37, 53, 102.

Diagnosis.–*W. iviei* can be diagnosed in the male by its bright color, by the form of the palp (Figs. 61, 62, 80) and by its geographical distribution. It is very similar to *W. rutilis* and *W. crocea*, from which *W. iviei* differs chiefly by the smaller diameter of its embolic coil (Fig. 61, cf. Figs. 63, 74). The female of *W. iviei* is diagnosed by its color and by the characteristic epigynum (Fig. 37), which in the only female I have seen is distinguishable from that of the closely related *W. rutilis* (Fig. 38) by the form of the internal ducts

which are visible through the integument. *W. iviei* and *W. rutilis* are readily separable by their internal genitalia, the ducts being shorter with a differently shaped path in *W. iviei* (Fig. 102, cf. Fig. 103), and the spermathecal extensions being differently shaped (Fig. 53, cf. Fig. 54).

Distribution.—Known only from the type locality in Mexico (Map 3).

Natural History.—Both sexes were adult in May; nothing was recorded on habitat.

Walckenaeria rutilis, new species
Figs. 38, 54, 63, 64, 83, 103; Map 4

Type.—Male holotype from 2 miles S.W. of Rio Frio, Puebla, Mexico, 2 May 1963 (W. J. Gertsch and W. Ivie); deposited in AMNH.

Description.—Both sexes were taken together. Total length: female 2.4-3.0 mm, male 2.1 mm. Carapace: length: female 1.0-1.15 mm, male 1.0 mm. Bright orange, with the eyes circled with black. Chelicerae: lateral striae moderately spaced in female, fairly widely spaced in male. Abdomen: whitish grey. Sternum: yellow to orange. Legs: femora orange, with the remaining segments a contrasting chestnut brown. TmI: female 0.45-0.50, male 0.51. Male palp: Figs. 63, 64, 83; orange, with the tibial apophysis deep brown distally. Epigynum: Figs. 38, 54, 103.

Diagnosis.—*W. rutilis* is diagnosed in the male by its bright coloration, by the form of the palp (Fig. 63), and by its geographical distribution. This species is distinguished from *W. iviei* male by the larger diameter of the embolic coil (Fig. 63, cf. Fig. 61). The palp of *W. crocea* is closely similar to that of *W. rutilis:* for the distinguishing characters, see *W. crocea* diagnosis. The palp of *W. rutilis* is structurally similar to that of *W. subvigilax*, but the brighter color of *W. rutilis* and its geographical distribution are sufficient to separate these two species. The female of *W. rutilis* is diagnosed by its color and by its characteristic epigynum (Fig. 38), which may possibly not always be distinguishable from that of *W. iviei* (Fig. 37); these two species are however separable by the form of the internal ducts (Fig. 103 cf. Fig. 102).

Distribution.—Known only from two localities in Mexico (Map 4).

Natural History.—The female was adult in April, the male in April-May; nothing was recorded on habitat.

Walckenaeria rufula, new species
Figs. 65, 66, 84; Map 3

Type.—Male holotype from 2 miles S.W. of Rio Frio, Puebla, Mexico, 24 July 1956 (W. J. Gertsch and V. Roth); deposited in AMNH.

Description.—Only the male is known. Total length: male 1.90 mm. Carapace: length: male 0.85 mm. Orange, with dusky markings. Chelicerae: lateral striae moderately spaced. Abdomen: black. Sternum: pale orange. Legs: femora orange, the remaining segments brown. TmI: male 0.45. Male palp: Figs. 65, 66, 84; the embolic coil is relatively small in diameter.

Diagnosis.—*W. rufula* male is diagnosed by the male palp (Fig. 65), coupled with its relatively bright color and geographical distribution. The palp is generally similar to that of *W. iviei* (Fig. 61), but the palp itself and the embolic coil are significantly smaller; the tibia of *W. rufula*, viewed laterally, is more turned down distally (Fig. 65 cf. Fig. 61), and the tailpiece is shorter and different in form (Fig. 66 cf. Fig. 62).

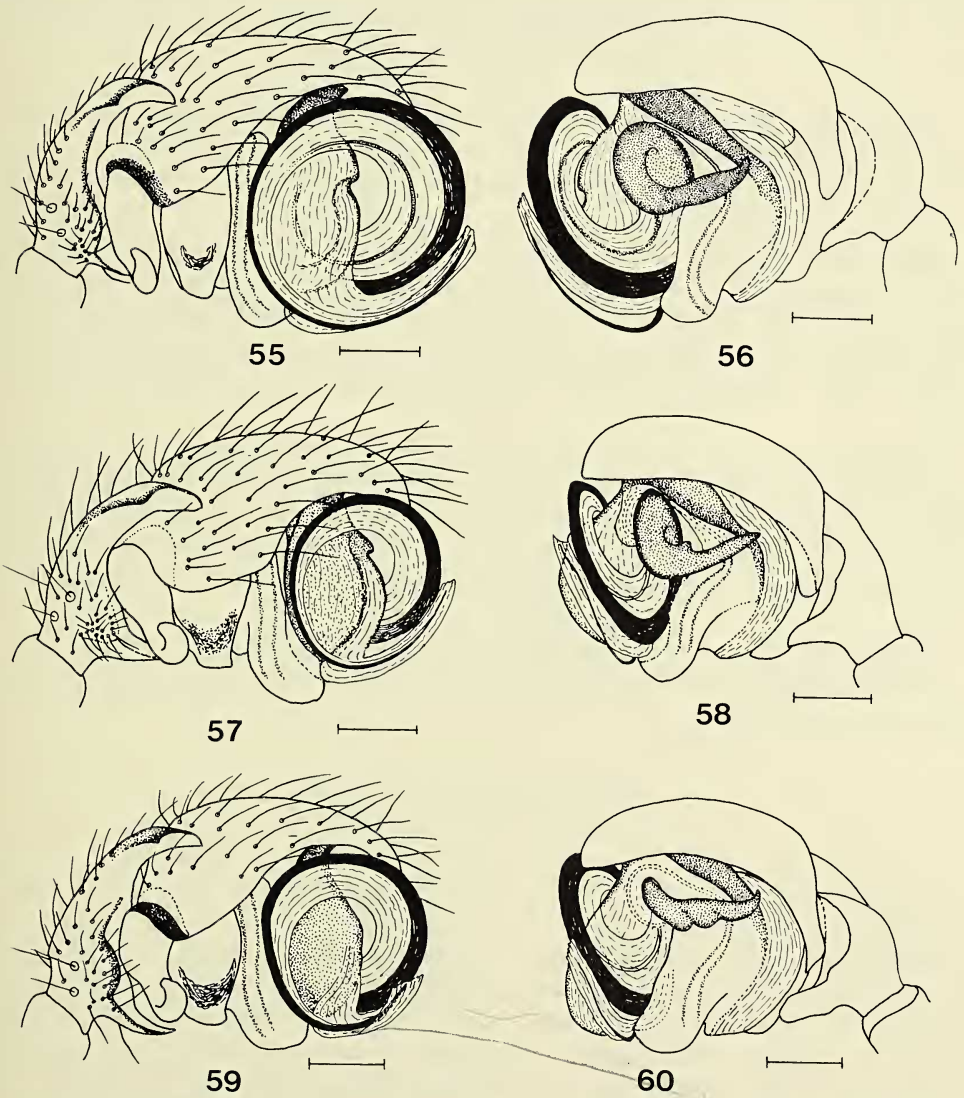
Distribution.–Known only from the type locality in Mexico (Map 3).

Natural History.–The male was adult in July: nothing was recorded on habitat.

Walckenaeria crocea, new species
Figs. 74, 75, 85, 86; Map 4

Type.–Male holotype from Tepetates Pass (15 miles W. Hidalgo), Michoacan, Mexico, 8 May 1963 (W. J. Gertsch and W. Ivie); deposited in AMNH.

Description.–Only the male is known. Total length: male 2.25 mm. Carapace: length: male 1.0 mm. Bright orange, with eyes circled with black. Chelicerae: lateral striae moderately spaced. Abdomen: almost white. Sternum: orange. Legs: femora bright



Figs. 55-60.–Male palps. 55, *W. pellax*, ectal; 56, *W. pellax*, mesal; 57, *W. fallax*, ectal; 58, *W. fallax*, mesal; 59, *W. subvigilax*, ectal; 60, *W. subvigilax*, mesal (Scale lines 0.1 mm).

orange, remaining segments chestnut brown. TmI: male 0.48. Male palp: Figs. 74, 75, 85, 86.

Diagnosis.—*W. crocea* male is diagnosed by the male palp (Fig. 74), by its bright coloration and by its geographical distribution. The palp is closely similar to that of *W. rutilis* (Fig. 63), but differs in the form of the SA, which has a membraneous piece within the embolic coil (M, Figs. 74, 75) which is absent in *W. rutilis;* the inner margin of the embolic coil is not blackened as in *W. rutilis*, and the coil is slightly smaller. The palpal tibiae of these two species also show differences (Fig. 85 cf. Fig. 83), as do the tailpieces (Fig. 75 cf. Fig. 64).

Distribution.—Known only from the type locality, in Mexico (Map 4).

Natural History.—Two males were adult in May: nothing was recorded on habitat.

Walckenaeria gertschi, new species
Figs. 76, 81, 91, 106, 116; Map 4

This species is named in honor of Willis J. Gertsch, who has been responsible for the capture of several new *Walckenaeria* species.

Type.—Male holotype from Penuela, Veracruz, Mexico, 26 April 1963 (W. J. Gertsch and W. Ivie); deposited in AMNH.

Description.—The two sexes were taken together. Total length: female 2.0-2.1 mm, male 1.65 mm. Carapace: length: female 0.95-1.0 mm, male 0.80 mm. Bright orange; the eyes are large (Fig. 116). Chelicerae: lateral striae fairly widely spaced in both sexes. Abdomen: grey-white. Sternum: yellow to orange, with dusky markings. Legs: yellow to orange. TmI: female/male 0.50-0.52. Male palp: Figs. 76, 81. Epigynum: Figs. 91, 106.

Diagnosis.—The male of *W. gertschi* is diagnosed by its coloration, by the form of the palp (Fig. 76) and particularly of the palpal tibia (Figs. 76, 81), and by its geographical distribution. No other known *Walckenaeria* species has the palpal tibia of this form. The female has a characteristic epigynum (Fig. 91), which distinguishes this species from all others. The diagnosis can be confirmed by the large eyes present in both sexes (Fig. 116).

Distribution.—Known only from two localities in Mexico (Map 4).

Natural History.—The female was adult in April, the males in April and May. Nothing was recorded on habitat.

Walckenaeria aenea, new species
Figs. 77, 82, 92, 104; Map 4

Type.—Male holotype from Tenejapa, Chiapas, Mexico, 22 July 1950 (C. Goodnight); deposited in AMNH.

Description.—Both sexes were taken together. Total length: female: 2.55 mm, male 2.0-2.2 mm. Carapace: length: female 1.05 mm, male 0.95-1.0 mm. Bright orange, suffused with some brown. Chelicerae: lateral striae fairly widely spaced in both sexes. Abdomen: greyish white. Sternum: orange-yellow to orange-brown. Legs: brown to orange-brown. TmI: female/male 0.53. Tibial spines in both sexes 1111. Male palp: Figs. 77, 82. Epigynum: Figs. 92. 106.

Diagnosis.—The male of *W. aenea* is diagnosed by the form of the palp and of the palpal tibia (Figs. 77, 82), by its coloration and by its geographical distribution. No other

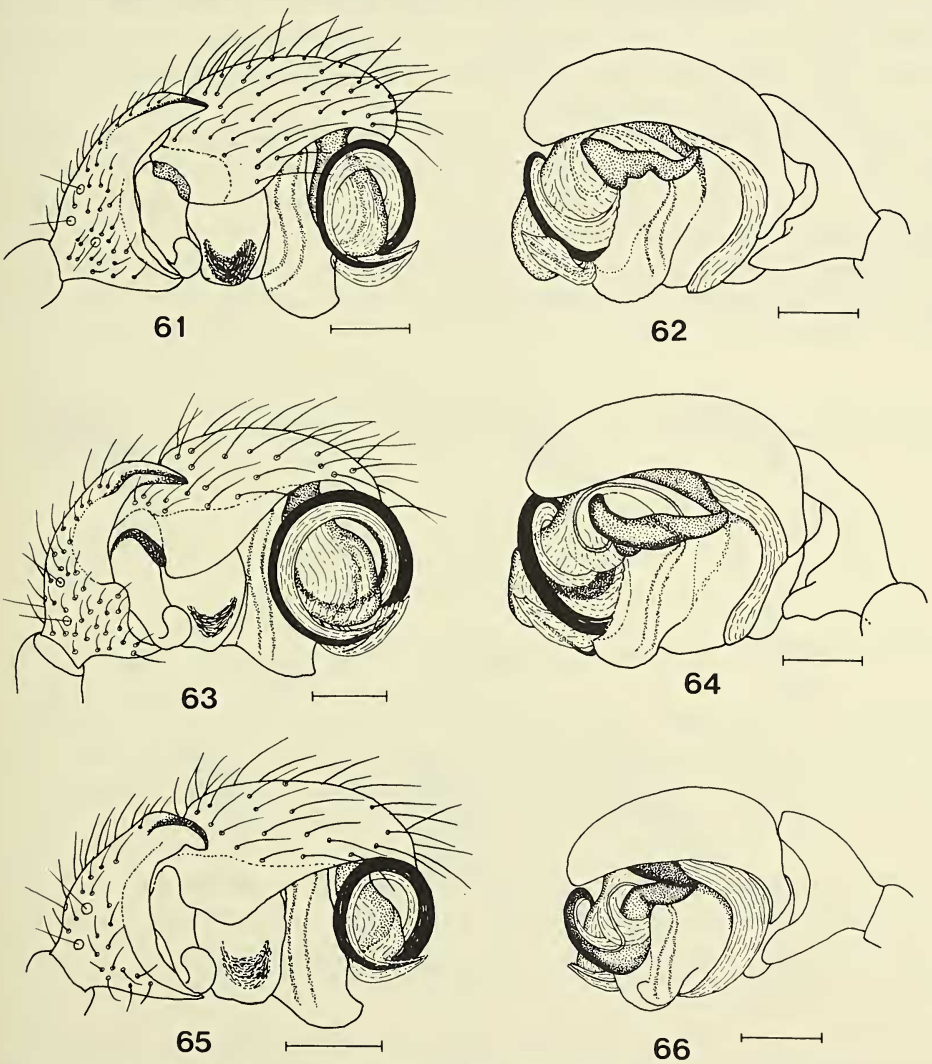
known species has the palpal tibia of the form shown. The female has a characteristic epigynum (Figs. 92, 106), which cannot be mistaken for that of any other species.

Distribution.–Known only from the type locality in Mexico (Map 4).

Natural History.–Both sexes were adult in July; nothing was recorded on habitat.

Walckenaeria capito (Westring)
Figs. 93, 97, 98, 99, 100, 101; Map 7

Erigone capito Westring 1861:213.
Walckenaera capito: Simon 1884:823 (male, not female).
Wideria capito: Simon 1926:408, 411, 504; Roewer 1942:670; Locket and Millidge 1953:197; Bonnet 1959:4820; Wiehle 1960:134.
Walckenaeria (Walckenaeria) capito: Wunderlich 1972:375.
Prosopotheca incisa: Simon 1884:831 (male, not female) (misidentification).
Walckenaeria (Heteroprosopotheca) vidua Wunderlich 1972:377. NEW SYNONYM.



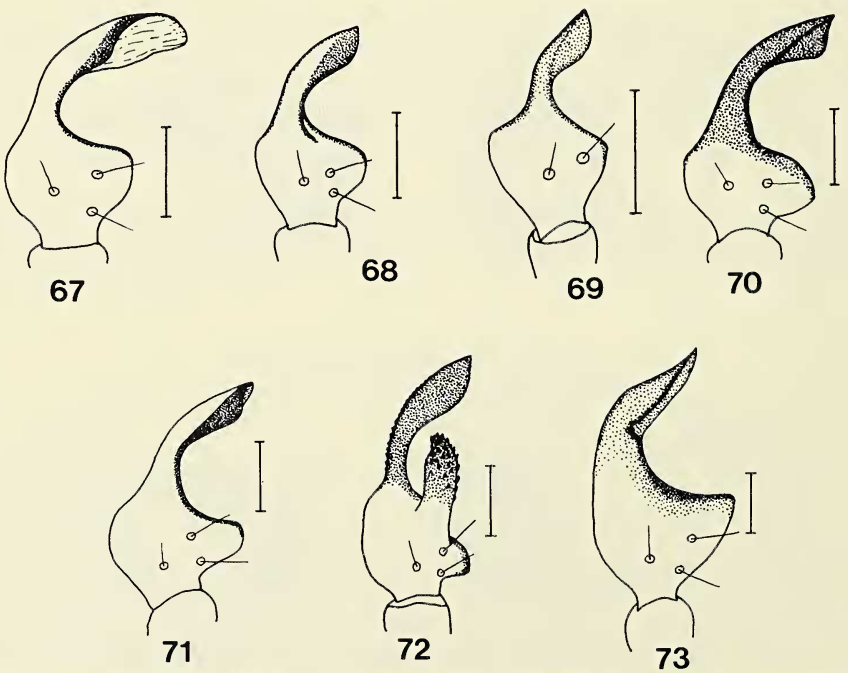
Figs. 61-66.–Male palps. 61,*W. iviei*, ectal; 62, *W. iviei*, mesal; 63, *W. rutilis*, ectal; 64, *W. rutilis*, mesal; 65, *W. rufula*, ectal; 66, *W. rufula*, mesal (Scale lines 0.1 mm).

Type.—Should be in Naturhistoriska Riksmuseet, Stockholm, but not located (T. Kronestedt, priv. comm.).

Description.—A single male only has been taken in N. America. In this specimen, and in Simon's male (*"Prosopotheca incisa"* male in MNHN, Paris), the large lobe which carries the posterior eyes has been broken off, possibly by the female during mating. The scar of this lobe in the Paris specimen was mistaken by Simon (1884:831) for the posterior median eyes, and was not commented upon by Wunderlich (1972: *W. vidua*). The N. American male is damaged (Figs. 99, 100) and the description given here is based on European specimens. Total length: female 3.0-3.5 mm, male 2.7-2.9 mm. Carapace: length: female 1.30-1.35 mm, male 1.45 mm. Brown to dark brown, with dusky markings and margins. The male carapace is raised anteriorly, and bears a large lobe which carries the posterior median eyes (Figs. 98, 100); the shape of the lobe shows some variation, the neck being sometimes quite narrow. The female carapace is also raised anteriorly (Fig. 101). Chelicerae: the lateral striae are moderately spaced in both sexes. Abdomen: grey to black. Sternum: light brown to orange-brown, suffused with black, particularly on margins. Legs: yellow to orange-brown. TmI: female 0.60-0.64, male 0.60-0.62. Male palp: Figs. 97, 99. Epigynum: Fig. 93.

Diagnosis.—The male of *W. capito* is diagnosed by the form of the carapace (Fig. 98), and by the form of the palpal tibia (Fig. 97). The female is diagnosed by the anterior elevation of the carapace (Fig. 101) coupled with the form of the epigynum (Fig. 93), which is distinct from that of any other species.

Distribution.—In Europe, this species has been recorded from most of the more northern and eastern countries. The only record from N. America is from Ontario (Map 7).



Figs. 67-73.—Male palpal tibiae, dorsal. 67, *W. spiralis*; 68, *W. arctica*; 69, *W. saniuana*; 70, *W. subvigilax*; 71, *W. fallax*; 72, *W. redneri*; 73, *W. castanea* (Scale lines 0.1 mm).

Natural History.–In Europe, adults of both sexes have been taken from May to October. The species has been recorded from mountains, up to ca. 1000 m, under stones, and at lower levels in herbage. The habitat of the Canadian specimen was not given.

Walckenaeria redneri, new species
Figs. 72, 94, 120; Map 1

This species is named in honor of J. H. Redner, who has captured several new species of *Walckenaeria.*

Type.–Male holotype from near Wasagaming, Riding Mountain National Park, Manitoba, 29 August 1979 (J. and M. Redner); deposited in CNC.

Description.–The two sexes were taken together. Total length: female 2.15 mm, male 2.0-2.1 mm. Carapace: length: female/male 1.0 mm. Pale brown to brown, suffused with black. Chelicerae: lateral striae moderately spaced in both sexes. Abdomen: grey to black. Sternum: brown, suffused with black, particularly on margins. Legs: pale brown to brown. TmI: female 0.55, male 0.50-0.60. Male palp: Figs. 72, 120; the embolic coil is large. Epigynum: Fig. 94; this is pale in color, and the spermathecae are widely separated. The rather pale colors of the specimens may indicate that they had only just attained maturity.

Diagnosis.–The male of *W. redneri* is diagnosed by the form of the palpal tibia (Fig. 72), which is unlike that of any other species, and confirmed by the form of the palp (Fig. 120). The female is diagnosed by the epigynum (Fig. 94), which is somewhat similar to that of *W. clavipalpe* (Fig. 95): these 2 species are readily distinguishable (see *W. clavipalpe* diagnosis).

Distribution.–Known only from Manitoba and Wisconsin (Map 1).

Natural History.–Adult males have been taken in August and October. The type was found in moss in a boggy area.

Walckenaeria clavipalpe, new species
Figs. 95, 117, 118; Map 1

Type.–Female holotype from Mt. Whiteface, New York, 13 September 1931 (C. R. Crosby); deposited in AMNH.

Description.–Only the female is known. Total length: female 3.0 mm. Carapace: length: female 1.30 mm. Orange-brown. Chelicerae: lateral striae very widely spaced (Fig. 117). Abdomen: grey-black. Sternum: orange-brown, with dusky markings and margins. Legs: yellow-brown. TmI: female 0.51. Female palp: tibia and tarsus swollen (Fig. 118). Epigynum: Fig. 95.

Diagnosis.–The female of *W. clavipalpe* is diagnosed by the epigynum (Fig. 95); this is fairly similar in appearance to that of *W. redneri* (Fig. 94), but *W. clavipalpe* is readily distinguished from this species by the much wider spacing of the cheliceral striae (Fig. 117) and by the swollen palpal segments (Fig. 118). *W. redneri* is also significantly smaller in size.

Distribution.–Known only from the type locality (Map 1).

Natural History.–The female was adult in September; nothing was recorded on habitat.

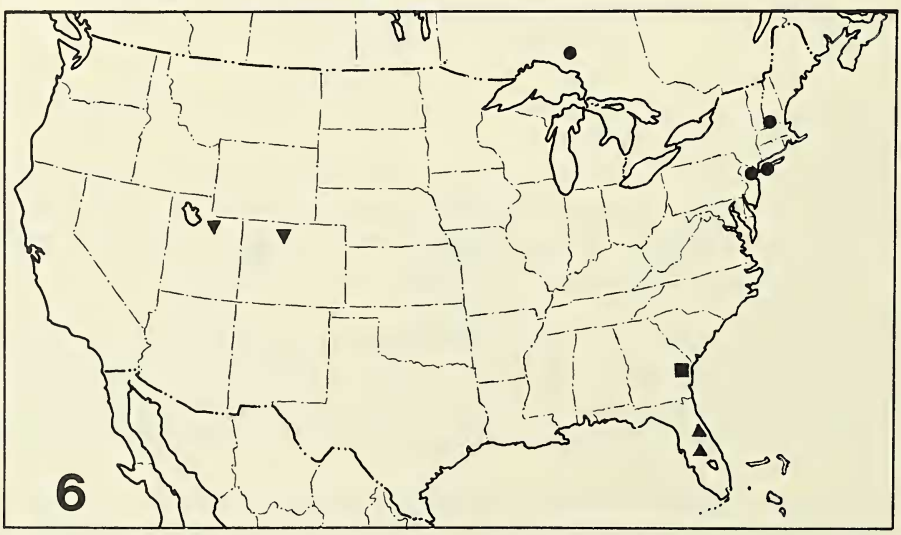
Walckenaeria castanea (Emerton), new combination
Figs. 73, 78, 79, 96, 105, 113, 114, 115; Map 8

Lophocarenum castaneum Emerton 1882:45.
Diplocephalus castaneus: Crosby and Bishop 1928:1046.
Minyriolus castaneus: Crosby and Bishop 1933:138; Roewer 1940:679; Kaston 1948:183; Bonnet 1957:2927.
Trachynella longidens Holm 1960:124 (type female, MCZ, examined). NEW SYNONYM.
Trachynella nudipalpis: Hackman 1954:67 (probably) (misidentification) (not *Erigone nudipalpis* Westring): I have not seen the specimen.

Type.—Male holotype from Beverly, Essex Co., Massachusetts, 9 November 1879; in MCZ, examined.

Description.—Total length: female 2.6-3.9 mm, male 2.45-3.0 mm. Carapace: length: female 1.10-1.45 mm, male 1.15-1.35 mm. Pale brown to chestnut brown, sometimes rather darker anteriorly. The male has anteriorly a small lobe with large holes and sulci on its sides (Figs. 113, 114); the lobe carries the posterior median eyes. The males from the far northwest *(T. longidens)* have the lobe slightly broader and the posterior median eyes marginally smaller (Fig. 115). Chelicerae: the lateral striae are moderately spaced. Abdomen: grey to black. Sternum: orange or orange-brown, with blackish margins. Legs: orange-brown to chestnut brown. TmI: female 0.43-0.45, male 0.42-0.47. Male palp: Figs. 73, 78, 79. The embolic coil is large; in the northwestern males *(longidens)* the coil tends to be slightly larger in diameter than shown in Fig. 73, but there is some variation in the diameter even amongst the eastern males. Female palp: tibia sometimes swollen distally, but less so than in *W. clavipalpe.* Epigynum: Figs. 96, 105; this bears a close resemblance to that of the European species *Walckenaeria nudipalpis* Westr.

The populations from the far northwest show minor differences from those of the centre and east, but these differences do not appear large enough or consistent enough to justify the retention of *W. longidens* as a separate species; there is no detectable difference between the internal genitalia of females from difference areas, nor can any stable differences be recognized in the male palps.

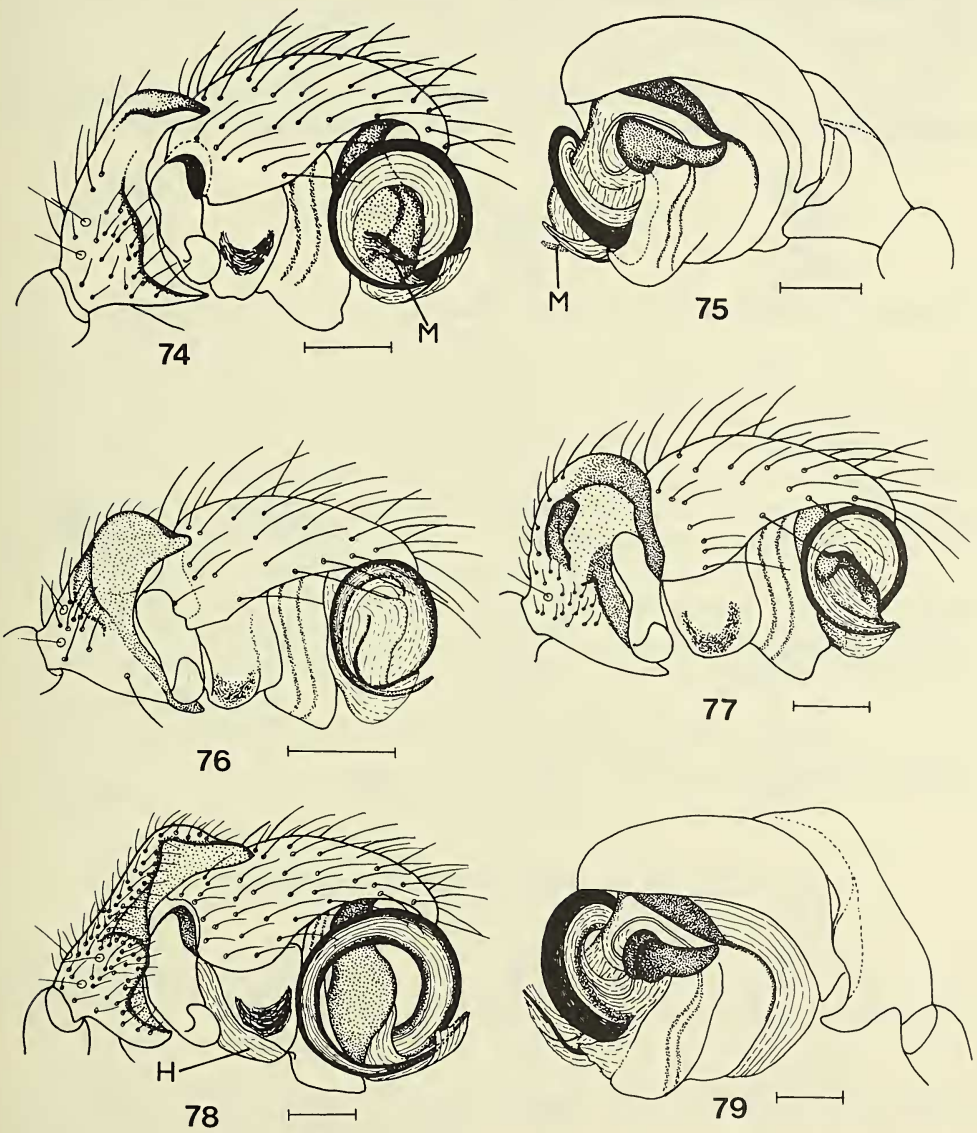


Map 6.—North America. Distribution of *W. digitata* (circles), *W. floridiana* (triangles), *W. maesta* (inverted triangles) and *W. dixiana* (square).

Diagnosis.–The male of *W. castanea* is diagnosed by the lobe on the carapace (Fig. 113), and confirmed by the form of the palpal tibia (Fig. 73) and the palpal organs (Fig. 78). The female is diagnosed by the epigynum (Fig. 96); the divergent, feather-like form of the anterior ducts seen through the integument is distinctive.

Distribution.–This species is widely distributed throughout N. America, apart from southern areas (Map 8).

Natural History.–Both sexes have been taken in practically every month of the year. Habitats recorded are a sphagnum bog, a pine swamp, moss in a boggy area, woods, tall grass, a soil sample, and under snow in February.



Figs. 74-79.–Male palps. 74, *W. crocea*, ectal; 75, *W. crocea*, mesal; 76, *W. gertschi*, ectal; 77, *W. aenea*, ectal; 78, *W. castanea*, ectal; 79, *W. castanea*, mesal; Abbreviations: H, haematodocha; M, membrane (Scale lines 0.1 mm).

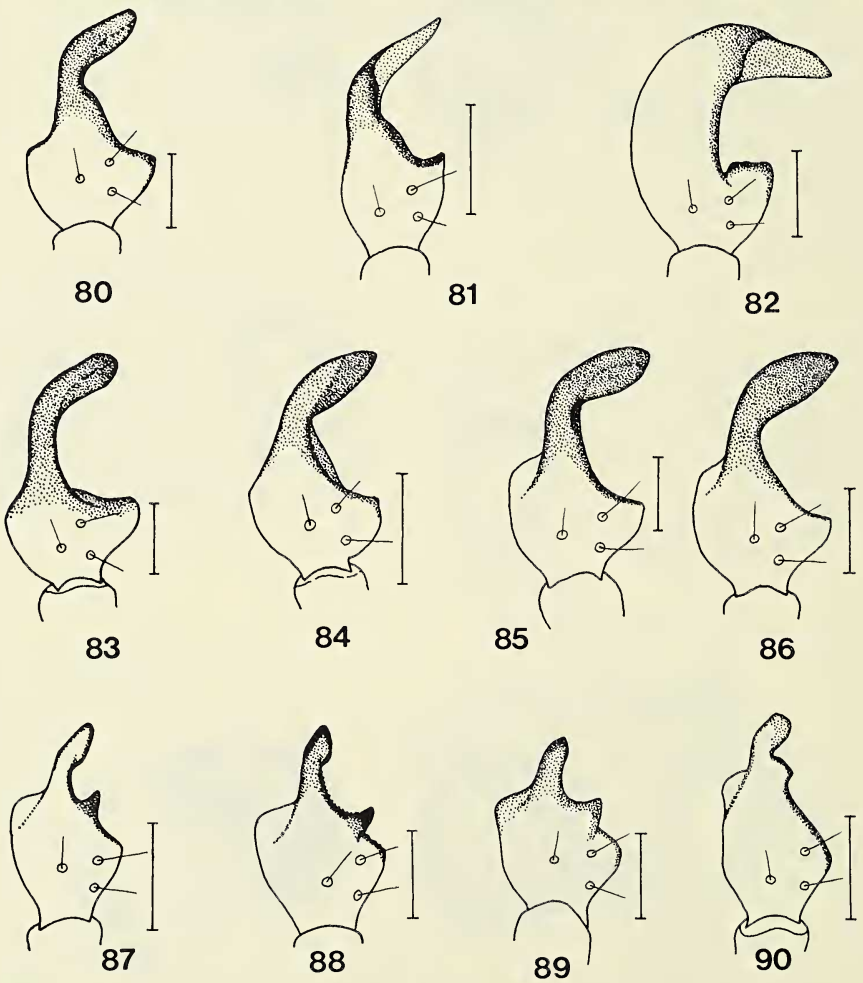
Walckenaeria dixiana (Chamberlin and Ivie), new combination
Figs. 87, 119, 122, 127; Map 6

Cornicularia dixiana Chamberlin and Ivie 1944:68.

Type.—Male holotype from 3 miles southeast of Savannah, Chatham Co., Georgia, 8 April 1943 (W. Ivie); in AMNH, examined.

Description.—Total length: female 1.9-1.95 mm, male 1.5-1.65 mm. Carapace: length: female 0.70-0.78 mm, male 0.70 mm. Brown, with dusky markings and margins. Chelicerae: lateral striae fairly widely separated in both sexes. Abdomen: whitish grey, suffused with black posteriorly around the spinners. Sternum: yellow, suffused with black. Legs: yellow-brown to orange. TmI: female 0.50, male 0.46. Male palp: Figs. 87, 119, 122; the embolic coil is rather small. Epigynum: Fig. 127.

Diagnosis.—The male of *W. dixiana* is diagnosed by the form of the palpal tibia (Fig. 87) and of the palp, which has the embolic coil relatively small in diameter (Fig. 119).



Figs. 80-90.—Palpal tibiae, dorsal. 80, *W. iviei*; 81, *W. gertschi*; 82, *W. aenea*; 83, *W. rutilis*; 84, *W. rufula*; 85, *W. crocea*; 86, *W. crocea*, another specimen; 87, *W. dixiana*; 88, *W. digitata*; 89, *W. maesta*; 90, *W. mexicana* (Scale lines 0.1 mm).

The abdominal coloration (pale grey-white, suffused with black around the spinners) offers confirmation of the identity. The male of *W. floridiana* does not seem to be distinguishable from that of *W. dixiana.* The males of *W. digitata* and *W. maesta* are also very similar to *W. dixiana*, but in both of these species the palps are significantly larger in size, there are small differences in the form of the palpal tibia (Figs. 88, 89 cf Fig. 87), and the tailpiece is longer (Fig. 124 cf. Fig. 122); the geographical distributions are also different from that of *W. dixiana.* The female of *W. dixiana* is diagnosed by the epigynum, which is pale in color and simple in form (Fig. 127); only *W. digitata* has a somewhat similar epigynum (Fig. 129), but this species is larger in size, the proportions of the legs are different (e.g. tibia I 1/d in *W. dixiana* is 5.5-6, in *W. digitata* is 7-7.5), and the geographical range appears to be different. The epigyna of *W. floridiana* (Fig. 128), *W. maesta* (Fig. 130) and *W. aurata* (Fig. 131) are sufficiently unlike *W. dixiana* to make confusion unlikely.

Distribution.–Known only from the type locality (Map 6).

Natural History.–Both sexes were taken in April; nothing was recorded on habitat.

Walckenaeria floridiana, new species
Fig. 128; Map 6

Type.–Female holotype from 2 miles south of Orange City, Volusia Co., Florida, 9 December 1962 (W. Ivie); deposited in AMNH.

Description.–Both sexes were taken together. Total length: female 1.90 mm, male 1.70 mm. Carapace: length: female 0.76 mm, 0.67 mm. Pale orange in female, brown to orange-brown with dusky markings and margins in male. Chelicerae: the lateral striae are moderately spaced in female, more widely spaced in male. Abdomen: practically white in female, grey in male, in both sexes suffused with black around the spinners. Sternum: pale yellow, with dusky margins. Legs: pale orange. TmI: female 0.50, male 0.50-0.56. Male palp: not distinguishable from that of *W. dixiana.* Epigynum: Fig. 128.

Diagnosis.–The male of *W. floridiana* appears to be indistinguishable from *W. dixiana* (see *W. dixiana* diagnosis). The female is diagnosed by the epigynum (Fig. 128), which is sufficiently distinct from that of *W. dixiana* (Fig. 127) and the other related species to make confusion unlikely.

Distribution.–Known only from two localities in Florida (Map 6).

Natural History.–Both sexes were taken in March and December; nothing was recorded on habitat.

Walckenaeria digitata (Emerton), new combination
Figs. 88, 107, 129; Map 6

Tmeticus digitatus Emerton 1913:256.
Prosopotheca digitata: Crosby and Bishop 1928:1051; Roewer 1942:665; Kaston 1948:169; Bonnet 1958:3782.

Type.–Male holotype from Cold Spring Harbor, Long Island, New York, 22 June 1903 (J. H. Emerton); in AMNH, examined.

Description.–The female, described here for the first time, was taken in the same general area as the male, but not with a male; hence its identity cannot be regarded as completely certain. Total length: female 2.40-2.80 mm, male 1.80 mm. Carapace: brown,

with dusky markings and margins. Chelicerae: lateral striae widely separated in both sexes. Abdomen: uniformly black in the male, grey suffused with black posteriorly around the spinners in the female. Sternum: brown, suffused with black. Legs: orange-brown. TmI: female 0.50-0.53, male 0.53. Male palp: Fig. 88; apart from their larger size, the palpal organs are practically identical with those of *W. dixiana.* Epigynum: Figs. 107, 129.

Diagnosis.—The male of *W. digitata* is very similar to those of *W. dixiana* and *W. floridiana* (see *W. dixiana* diagnosis), and to that of *W. maesta*; from the latter species, *W. digitata* male can be distinguished by a small difference in the palpal tibiae (Fig. 88 cf. Fig. 89) and probably by the geographical distribution. The epigyna of *W. digitata* and *W. dixiana* are very similar (Fig. 129 cf. Fig. 127), but appear to be distinguishable by the rather wider posterior "plate" in *W. digitata*, and the species can also be separated by a larger size of *W. digitata.* The epigyna of the related species *W. maesta* (Fig. 130), *W. floridiana* (Fig. 128) and *W. aurata* (Fig. 131) are not likely to be confused with that of *W. digitata.*

Distribution.—*W. digitata* is known only from four localities in a limited area of the northeast of N. America (Map 6).

Natural History.—Males have been taken in June, females in July. Nothing was recorded on habitat.

Walckenaeria maesta, new species
Figs. 89, 121, 124, 130; Map 6

Type.—Female holotype from west of Fort Collins, Lorimer Co., Colorado, 7,300 ft., 28 July 1946 (C. C. Hoff); deposited in AMNH.

Description.—The male described here was taken in Utah, some 5° west of the type locality; until the two sexes are taken together, the identity of the male cannot be regarded as completely certain. Total length: female 2.55 mm, male 1.90 mm. Carapace: length: female 1.0 mm, male 0.90 mm. Brown, heavily suffused with black anteriorly and on margins. Chelicerae: lateral striae moderately widely separated in both sexes. Abdomen: grey-black to black. Sternum: brown, suffused with black. Legs: yellow to orange-brown. TmI: female 0.50, male 0.48. Male palp: Figs. 89, 121, 124; the palpal organs are closely similar to those of *W. dixiana.* Epigynum: Fig. 130.

Diagnosis.—The palp of *W. maesta* (Fig. 121) is very similar to that of *W. dixiana* (Fig. 119) and *W. floridiana*, but is larger in size; the tegular duct on the ectal side is relatively narrower, and the tailpiece is longer (Fig. 124 cf. Fig. 122). The abdomen of *W. maesta* is darker in color than in *W. dixiana* or *W. floridiana. W. maesta* male is separable from *W. digitata* only by the relatively narrower tegular duct on the ectal side. The female of *W. maesta* is diagnosed by the epigynum (Fig. 130), which should be distinguishable from those of the related species (Figs. 127, 128, 129, 131); the geographical distribution should be also be taken into account.

Distribution.—Known only from Colorado and Utah (Map 6).

Natural History.—The female was taken in July, the male in June. The type habitat was at ca. 2200 m, but no further details were given.

Walckenaeria aurata, new species
Fig. 131; Map 5

Type.–Female holotype from Tepoztlan, Morelos, Mexico, 5 May 1963 (W. J. Gertsch and W. Ivie); deposited in AMNH.

Description.–Only the female is known. Total length: female 2.05 mm. Carapace: length: female 0.75-0.80 mm. Orange. Chelicerae: lateral striae moderately spaced. Abdomen: almost white, faintly blackened around spinners. Sternum: yellow-orange. Legs: orange-brown. TmI: female 0.45-0.47. Epigynum: Fig. 131.

Diagnosis.–*W. aurata* female is diagnosed by the epigynum (Fig. 131); *W. maesta* has the epigynum (Fig. 130) somewhat similar in shape, but this species is darker in color and has a different geographical distribution.

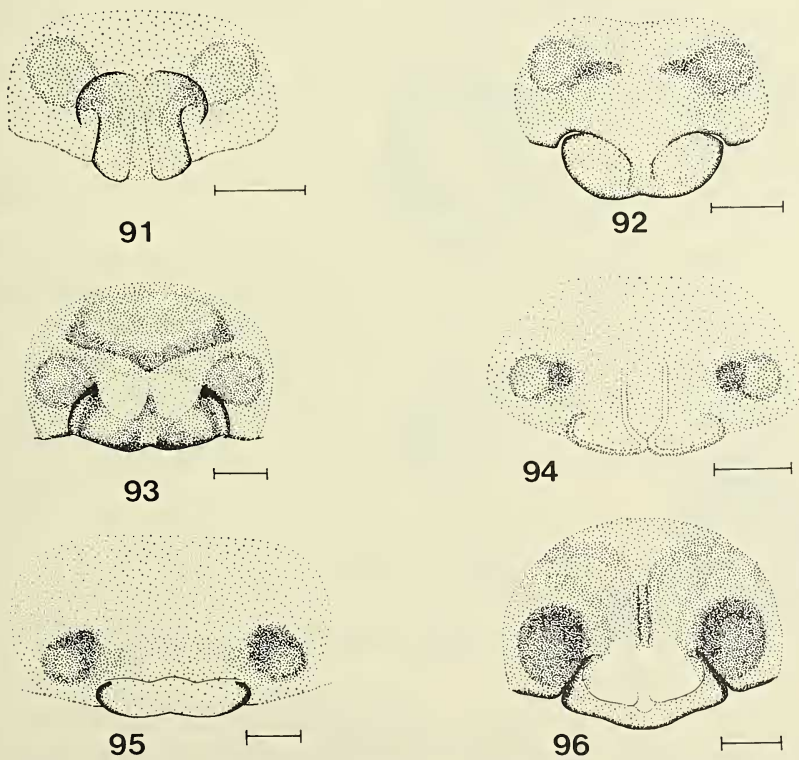
Distribution.–Known only from the type locality in Mexico (Map 5).

Natural History.–The females were taken adult in May; nothing was recorded on habitat.

Walckenaeria mexicana, new species
Figs. 90, 123; Map 5

Type.–Male holotype from 6 miles north east of El Salto, Durango, Mexico, 11 August 1947 (W. J. Gertsch); deposited in AMNH.

Description.–There is only the type specimen, which has the abdomen missing. Carapace: length: male 0.80 mm. Orange, slightly darkened anteriorly. Chelicerae: lateral striae fairly well spaced. Sternum: orange-yellow. Legs: orange-brown. TmI: male 0.40.



Figs. 91-96.–Epigyna. 91, *W. gertschi*; 92, *W. aenea*; 93, *W.capito*; 94, *W. redneri*; 95, *W. clavipalpe*; 96, *W. castanea* (Scale lines 0.1 mm).

Male palp: Figs. 90, 123; the embolic coil is small. There is a possibility that this is the male of *W. aurata*; it is considered unlikely that it is the male of *W. discolor*, which was taken in the same locality (but at a different time), because of the wide discrepancy in the values of TmI.

Diagnosis.—This species is diagnosed by the form of the palpal tibia (Fig. 90), which differs from those of the other species of the *dixiana* type; confirmation is given by the palp (Fig. 123), in which the embolic coil is smaller in diameter than in the other species.

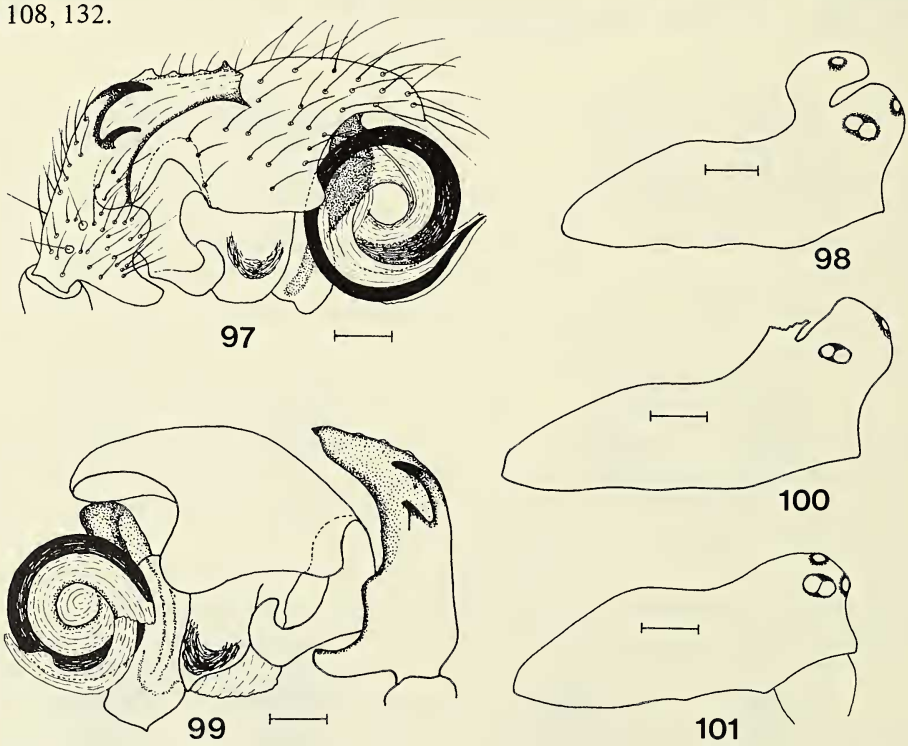
Distribution.—Known only from the type locality in Mexico (Map 5).

Natural History.—The male was adult in August; nothing was recorded on habitat.

Walckenaeria puella, new species
Figs. 108, 132; Map 5

Type.—Female holotype from Alice, Jim Wells Co., Texas, 15-30 May 1961 (R. O. Albert); deposited in MCZ.

Description.—Only the female is known. Total length: female 2.0 mm. Carapace: length: female 0.75 mm. Pale yellow, shading to pale orange anteriorly. Chelicerae: lateral striae moderately spaced. Abdomen: practically white, suffused with grey around the spinners. Sternum: pale yellow. Legs: pale yellow-brown. TmI: female 0.51. Epigynum: Figs. 108, 132.



Figs. 97-101.—*W. capito*. 97, male palp, ectal, European specimen; 98, male carapace, lateral, European specimen; 99, male palp, left, damaged, Canadian specimen; 100, male carapace, Canadian specimen; 101, female carapace, lateral, European specimen (Scale lines, 97, 99, 0.1 mm; 98, 100, 101, 0.2 mm).

Diagnosis.–*W. puella* is diagnosed by it its pale color and by the epigynum (Fig. 132), which is sufficiently different from those of all other species to make confusion unlikely.

Distribution.–Known only from the type locality (Map 5).

Natural History.–The female was adult in May; nothing was recorded on habitat.

Walckenaeria blanda, new species
Figs. 35, 45, 52; Map 2

Type.–Female holotype from Rustler Park, Chiricahua Mts., Cochise Co., Arizona, 23 May 1963 (W. J. Gertsch and W. Ivie); deposited in AMNH.

Description.–Only the female is known. Total length: female 2.35-2.45 mm. Carapace: length: female 0.90-0.95 mm. Orange to orange-brown, with dusky markings and ocular area suffused with black. Abdomen: grey-black. Sternum: orange, with dusky markings and margins. Legs: orange to orange brown. TmI: female 0.50. Epigynum: Figs. 35, 45, 52. In the absence of the male, it is uncertain whether *W. blanda* is correctly placed in the *acuminata* species group; the internal genitalia of the female show some similarities to those of *W. directa* (Fig. 178).

Diagnosis.–*W. blanda* can be diagnosed by the epigynum (Fig. 35), which differs sufficiently from those of other species to make confusion unlikely. The diagnosis can be confirmed by the form of the internal genitalia (Figs. 45, 52).

Distribution.–The species is known from mountainous areas in Arizona and New Mexico.

Natural History.–Adult females have been taken in May, August and September; nothing was recorded on habitat.

directa Group

The males of this group have closely similar palpal tibiae and palpal organs, but diagnosis is fairly easy on the basis of the form of the carapace horn or lobe. Most of the females have virtually identical epigyna; the distinct differences depicted in the figures given by Crosby and Bishop (1931) appear to be exaggerated, and with the museum material which I have examined the epigyna of most species show no real or constant differences. The females of most species can be diagnosed satisfactorily on the basis of other characters, but there are occasions when the diagnosis is uncertain unless the female is taken with the male.

Partial keys to the species

Males

1. Carapace with horn projecting forwards from the ocular area (e.g. Figs. 142, 145, 152) 2
   Carapace without a forward-projecting horn 3

2. Horn relatively long (Figs. 142, 143, 144) . . . . . *directa, subdirecta, communis, indirecta* (see species descriptions)
   Horn shorter (Figs. 145, 152) . . . . . *brevicornis, breviaria* (see species descriptions)

3. Carapace more or less smoothly raised anteriorly (Figs. 147, 149, 150, 153). . . . . *pallida, subpallida, prominens, carolina* (see species descriptions)
   Carapace with small knob-like lobe in ocular area (Figs. 151, 154) 4

4. Lobe distinctly forked in anterior view (Fig. 162) . . . . . *dondalei*
   Lobe not forked (Fig. 163) . . . . . *oregona*

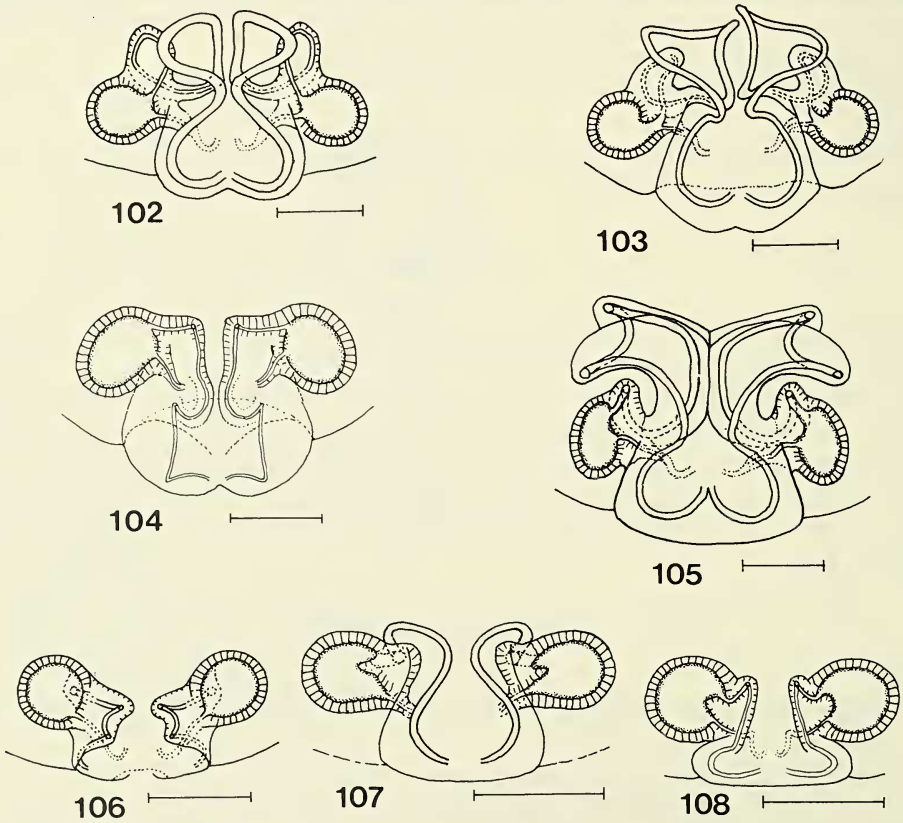
Females

1. Pedicel relatively long and exposed (Fig. 167). 2
   Pedicel short and less conspicuous 3

2. Abdomen grey to black; tibia I 1/d 5.5-6 . . . . . *indirecta*
   Abdomen whitish, darkened around spinners; tibia I 1/d 7.5-9 . . . . . *pallida, subpallida* (see species descriptions)

3. Carapace darkened in cephalic area . . . . . *communis, brevicornis, dondalei* (see species descriptions)
   Carapace not darkened in cephalic area 4

4. Epigynum Fig. 177; carapace raised anteriorly (Fig. 166) . . . . . *carolina*
   Epigynum Fig. 175; carapace less sharply raised . . . . . *directa, subdirecta, oregona* (see species descriptions)



Figs. 102-108.—Female genitalia, cleared, dorsal. 102, *W. iviei*; 103, *W. rutilis*; 104, *W. aenea*; 105, *W. castanea*; 106, *W. gertschi*; 107, *W. digitata*; 108, *W. puella* (Scale lines 0.1 mm).

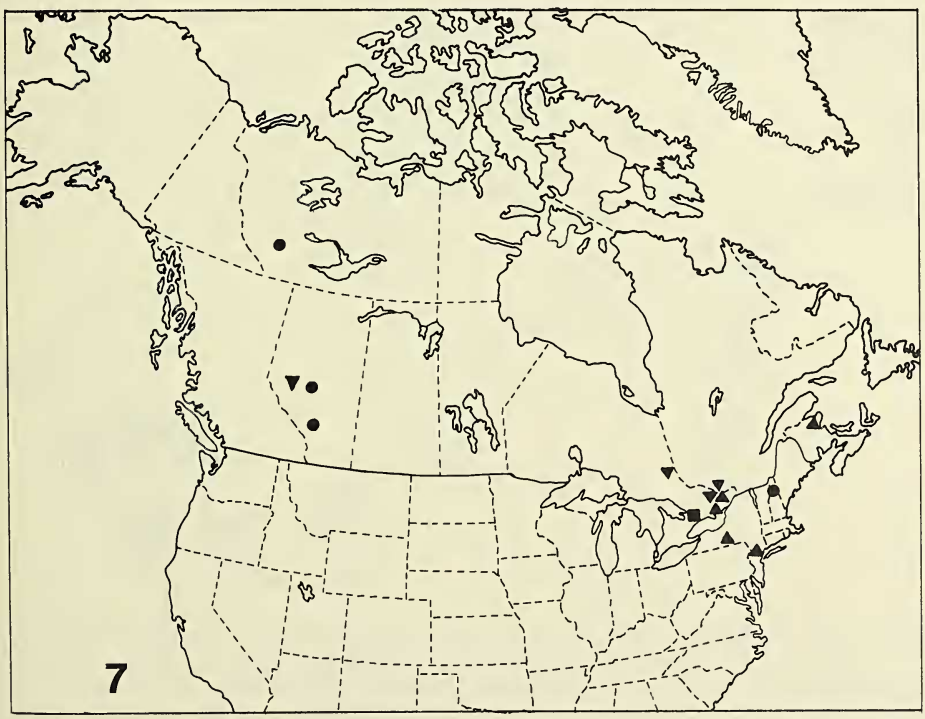
Walckenaeria directa (O.P.-Cambridge)
Figs. 133, 137, 138, 139, 142, 168, 175, 178, 303, 305, 308, 310; Map 9

Erigone directa O.P.-Cambridge 1874:439.
Cornicularia directa: Emerton 1882:40 (in part); Crosby and Bishop 1931:367 (in part); Roewer 1942:663 (in part); Kaston 1948:166 (in part); Bonnet 1956:1223 (in part).
Walckenaeria (Pseudoprosopotheca) directa: Wunderlich 1972:383 (in part).

In the past, *W. directa* has not been differentiated from its sibling species *W. subdirecta.*

Type.–Male and female syntypes in the Hope Entomological Collections, Oxford; examined. The type locality is not given.

Description.–Total length: female 2.1-2.9 mm, male 2.0-2.7 mm. The largest specimens have been those taken in Alaska. Carapace: length: female 0.95-1.15 mm, male 0.90-1.15 mm (excluding horn). Deep chestnut brown, with dusky margins and markings. The male bears anteriorly a horn (Figs. 139, 142, 303) which comprises a large upper section and a small lower section separated by a cleft. The anterior hairs on the horn appear under the binocular microscope to be "spatulate", but are actually trifurcate, arising from deep pits (Figs. 303, 305); the simple hairs on the posterior part of the horn are all reflexed (Fig. 142). Chelicerae: the lateral striae are moderately widely spaced in the female (Fig. 308), but more closely spaced in the male (Fig. 310). Abdomen: grey to black. Sternum: orange to chestnut brown, with blackish margins; the surface is smooth and shiny but marked to a variable degree with minute pits. Legs: orange to brown. TmI: female 0.45-0.55, male 0.48-0.56. Female palp: tibia and tarsus usually darker in color

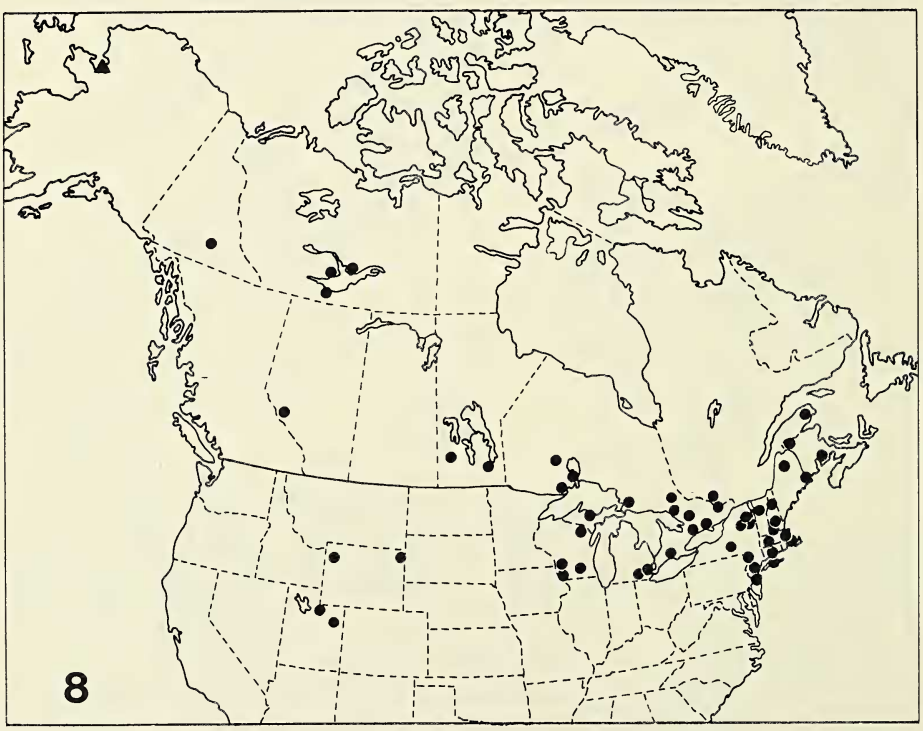


Map 7.–North America. Distribution of *W. arctica* (circles), *W. microspiralis* (triangles), *W. fallax* (inverted triangles) and *W. capito* (square).

than the legs. Male palp: Figs. 133, 137, 138, 168; anteriorly the ED has a blunt point, often colorless and transparent, as in *W. pallida* (Fig. 134). Epigynum: Figs. 175, 178.

Diagnosis.—The male of *W. directa* is diagnosed by the carapace horn. The horns (which show small intraspecific variations in shape and length) are generally similar in *W. directa, W. subdirecta, W. communis* and *W. indirecta*: the distinguishing characters are as follows. In *W. directa* (Figs. 139, 142) and *W. subdirecta* the dorsal hairs extend posteriad almost to the posterior median eyes, all the hairs being reflexed. In *W. communis* (Figs. 140, 143) the hairs extend scarcely to the base of the horn, and posteriorly the hairs incline forwards; the carapace is usually more orange in *W. communis* than in *W. directa.* In *W. indirecta* (Figs. 141, 144) the horn is rather shorter, the spatulate hairs extend posteriad along the whole length of the horn, and the posterior row of eyes is strongly procurved; this species also has a relatively long sclerotized pedicel, more or less as in *W. pallida* (Fig. 167). *W. directa* and *W. subdirecta* males are separated by the cheliceral file, the striae being very closely spaced in *W. subdirecta* (Fig. 311) and significantly more widely spaced in *W. directa* (Fig. 310); the differences are clearly visible in the optical microscope. The female of *W. directa* is grouped with *W. subdirecta* and *W. oregona* in the key. The separation of these three species is not possible by the epigyna, but is based on the spacing of the cheliceral file. The striae are closely spaced in *W. subdirecta* (Fig. 309) and more widely spaced in *W. directa* (Fig. 308); in *W. oregona* the spacing is significantly wider again than in *W. directa*, and with experience, with authentic specimens for comparison, the separation of these two species is not difficult. The distribution of *W. oregona* (west coast only) should also be borne in mind for diagnosis.

Distribution.—Widely distributed throughout N. America apart from the extreme south (Map 9). *W. directa* appears to be sympatric with *W. subdirecta* in several localities.



Map 8.—North America. Distributions of *W. castanea* (circles) and *W. fraudatrix* (triangle).

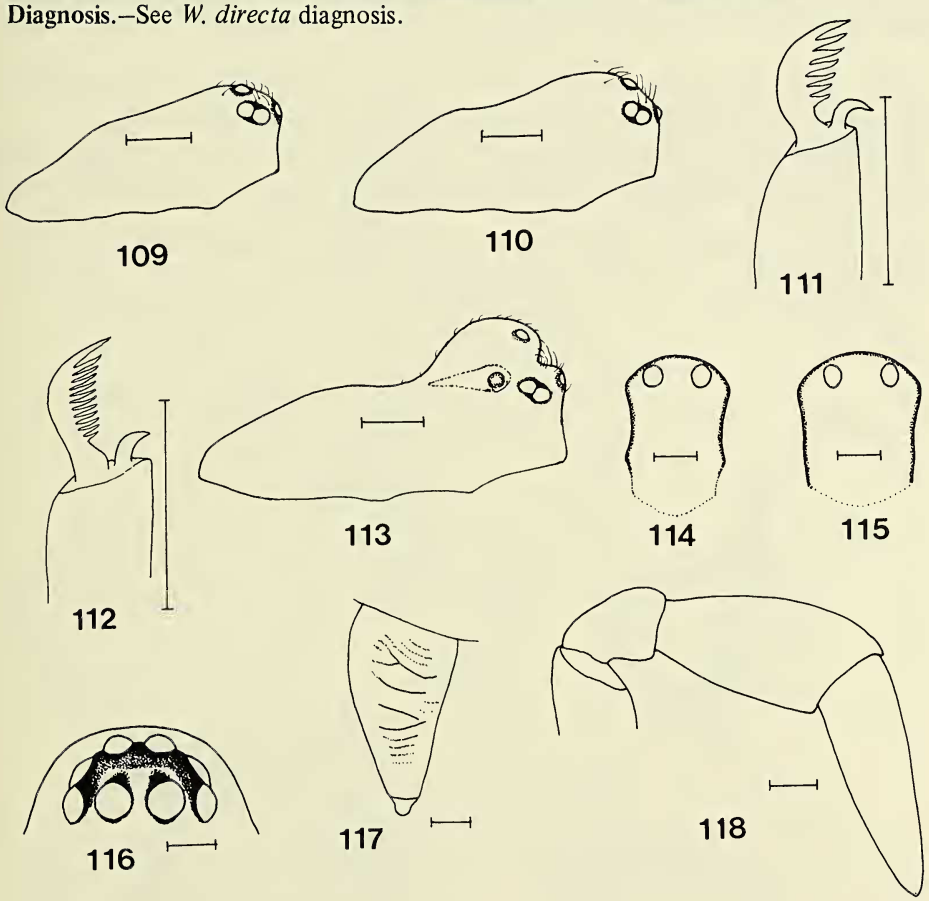
Natural History.–Adults of both sexes have been taken in all months except January. The only habitats recorded are in grass, in leaf litter, in hardwood litter, amongst shrubs (pitfall), and it has been observed ballooning in October.

Walckenaeria subdirecta, new species
Figs. 304, 309, 311; Map 10

Type.–Male holotype from east of Jamison (Horseshoe Bend, Neshaminy Creek), Pennsylvania, 28 September 1953 (W. Ivie); deposited in AMNH.

Description.–In size, color and genitalia this species is not distinguishable from *W. directa.* Carapace: Fig. 304; the horn is probably not distinguishable from that of *W. directa.* Chelicerae: the lateral striae are close together in the female (Fig. 309), very close together in the male (Fig. 311). Legs: TmI: female 0.50-0.58, male 0.51-0.60.

Diagnosis.–See *W. directa* diagnosis.



Figs. 109-118.–109, *W. spiralis*, male carapace, lateral; 110, *W. microspiralis*, male carapace, lateral; 111, *W. communis*, female, tarsal claw, leg I; 112, *W. spiralis*, female, tarsal claw, leg I; 113. *W. castanea*, male carapace, lateral; 114, *W. castanea*, male carapace lobe, dorsal; 115, *W. castanea*, male carapace lobe, dorsal, Alberta specimen; 116, *W. gertschi*, female eyes, dorsal; 117, *W. clavipalpe*, female, left chelicera; 118, *W. clavipalpe*, female palp (Scale lines 0.1 mm, except 109, 110, 113, 0.2 mm).

Distribution.–Fairly widely distributed throughout N. America (Map 10), though noticeably less so (on current knowledge) than *W. directa* (Map 9). The species appears to be sympatric with *W. directa* in several localities.

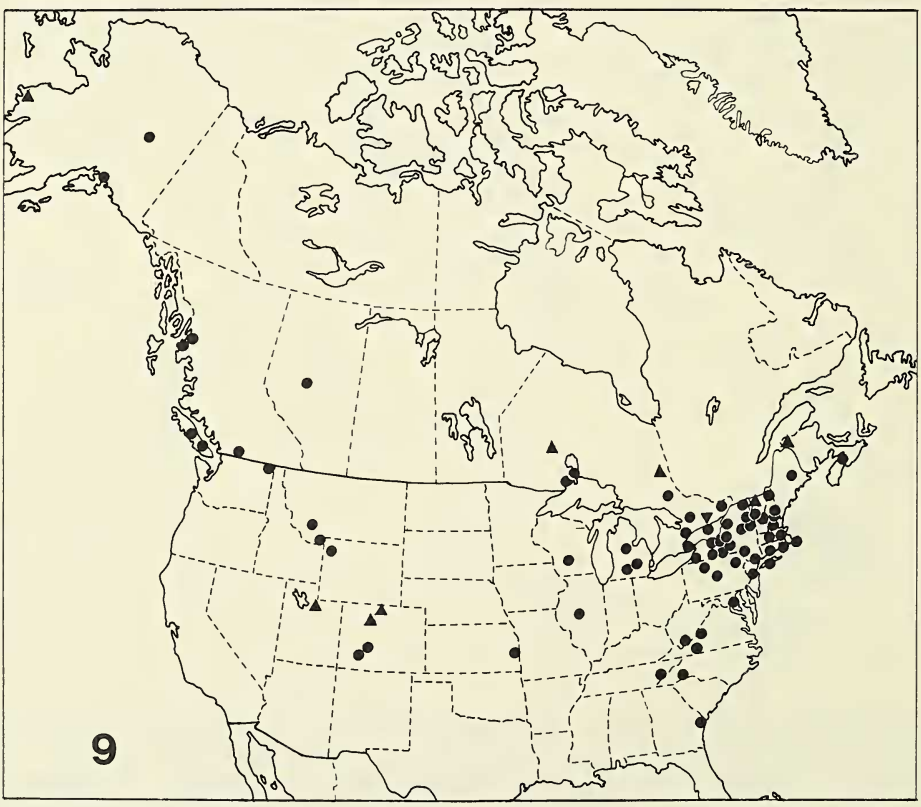
Natural History.–Adult females have been taken from March to December, males in January and from March to October. Habitats recorded are in grass and meadows, in woods, in bog, on dunes amongst pines, in leaf litter, under stones and on low vegetation (sweeping).

Walckenaeria communis (Emerton)
Figs. 111, 140, 143, 164, 306; Map 11

Cornicularia communis Emerton 1882:41; Crosby and Bishop 1931:366; Roewer 1942:663; Kaston 1948:165; Bonnet 1956:1221.
Walckenaeria (Pseudoprosopotheca) communis: Wunderlich 1972:383.
Cornicularia varipes Banks 1900:479; female type from NMNH examined. NEW SYNONYM.

Type.–Male and female syntypes from Clarendon Hills, Hyde Park, Suffolk Co., Massachusetts, 4 March 1878; in Emerton Collection, MCZ, examined.

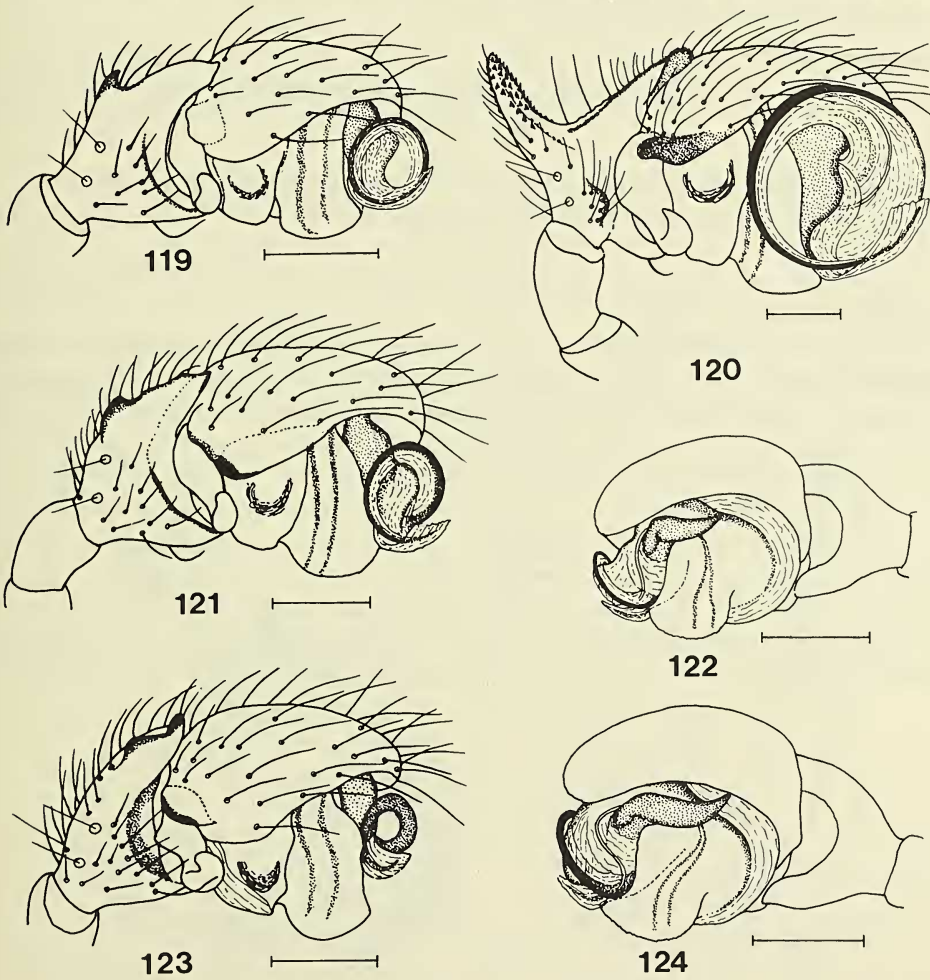
Description.–Total length: female 2.5-3.2 mm, male 2.45-3.1 mm. Carapace: length: female 0.95-1.2 mm, male 1.2-1.3 mm (excluding horn). Orange to deep reddish orange in



Map 9.–North America. Distributions of *W. directa* (circles), *W. cuspidata brevicula* (triangles) and *W. dondalei* (inverted triangle).

female, darkened anteriorly, often to almost black. The male carapace is similarly colored, but the anterior darkening is much less pronounced or even absent. Recently molted specimens are paler in color, but the female carapace seems always to be darkened anteriorly. The posterior hairs on the male horn (Figs. 140, 143) are short and directed forwards. Chelicerae: the lateral striae in the female are somewhat less widely spaced than in *W. directa*, but further apart than in *W. subdirecta*; in the male, the striae are very closely spaced, even more so than in *W. subdirecta.* There is little variation in the spacing of the striae throughout the whole range of the species. Abdomen: grey to black. Sternum: pale brown to orange, with dusky margins; the surface is smooth and shiny with no pits. Legs: yellow-brown to orange, with the three distal segments darkened to a variable degree in the female. TmI: female/male 0.50-0.62. Female palp: tibia and tarsus usually darkened. Male palp: indistinguishable from that of *W. directa.* Epigynum: indistinguishable from that of *W. directa.*

Diagnosis.–The male of *W. communis* is diagnosed by the carapace horn: see *W. directa* diagnosis. The female of *W. communis* is associated with *W. brevicornis* and *W.*



Figs. 119-124.–Male palps. 119, *W. dixiana*, ectal; 120, *W. redneri*, ectal; 121, *W. maesta*, ectal; 122, *W. dixiana*, mesal; 123, *W. mexicana*, ectal; 124, *W. maesta*, mesal (Scale lines 0.1 mm).

dondalei in the key. The epigynum of *W. communis* is indistinguishable from that of *W. dondalei*, but is distinguishable from that of *W. brevicornis* in specimens of the latter where the dark markings enclosing the posterior area extend forwards as converging lines as shown in Fig. 176. Not all females of *W. brevicornis* have this distinctive form of the epigynum, which in any case is liable to fade in preserved specimens, and hence the separation of *W. communis* from *W. brevicornis* by the epigynum is not always possible. In *W. communis* female there is usually some darkening of the distal segments of the legs, which is absent in *W. brevicornis* and *W. dondalei*, and the carapace of *W. communis* is slightly more raised behind the eyes (Fig. 164) than in these two species (Fig. 165); *W. communis* also tends to be larger in size. All these differences are small, and the separation of the females of these three species is not reliable in some instances.

Distribution.—*W. communis* is widely distributed throughout N. America, except for the more southerly parts (Map 11).

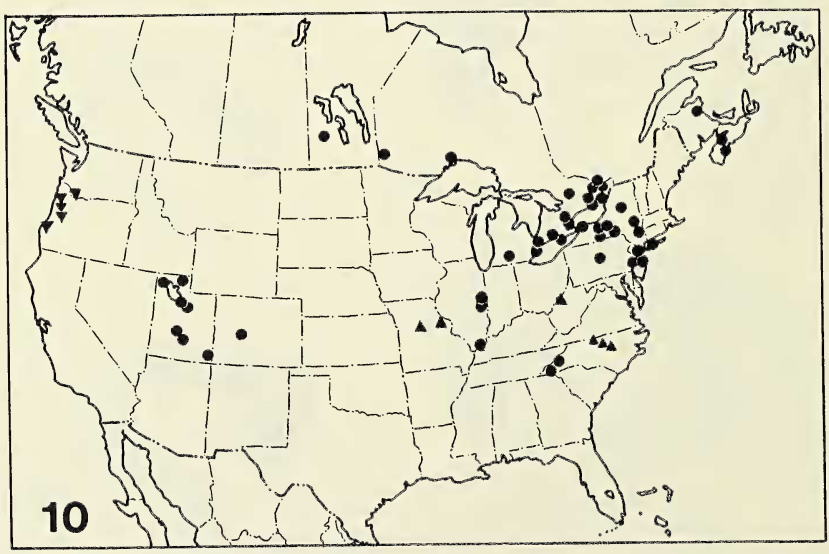
Natural History.—Adults of both sexes have been taken in all months except January. The only habitats recorded are a lake shore, wet grass, and moss in fir woods; it has also been recovered from a frog's stomach in Alaska.

Walckenaeria breviaria (Crosby and Bishop)
Fig. 145; Map 12

Cornicularia breviaria Crosby and Bishop 1931:362; Roewer 1942:662; Bonnet 1956:1221.
Walckenaeria (Pseudoprosopotheca) breviaria: Wunderlich 1972:283.

Type.—Male holotype from Interlaken, Seneca Co., New York, 26 November 1915 (Bishop); in AMNH, examined.

Description.—Only the male is known. Total length: male 2.1 mm. Carapace: length: male 1.0 mm. Chestnut brown, with dusky markings. The horn (Fig. 145) resembles a shortened version of that of *W. directa.* Chelicerae: the lateral striae are fairly closely



Map 10.—North America. Distributions of *W. subdirecta* (circles), *W. carolina* (triangles) and *W. oregona* (inverted triangles).

spaced. Abdomen: black, with faint paler chevrons posteriorly. Sternum: orange, with blackish margins; a few tiny pits are present. Legs: orange-yellow. TmI: male 0.50. Male palp: identical with that of *W. directa.* It must be questionable whether *W. breviaria* is a good species; it is possible that the male is only an abnormal specimen of *W. directa* or *W. subdirecta.*

Diagnosis.–*W. breviaria* male is diagnosed by the form of the carapace horn (Fig. 145), which is rather similar to that of *W. brevicornis* (Fig. 152). These two species can be separated by the palps, which in *W. breviaria* are as in *W. directa* (tibia Fig. 168, membraneous part of SA Fig. 133; cf. Figs. 169, 135 for *W. brevicornis*); an additional difference is that the carapace of *W. brevicornis* is somewhat darkened anteriorly.

Distribution.–Known only from the type locality (Map 12).

Natural History.–The male was adult in November; nothing was recorded on habitat.

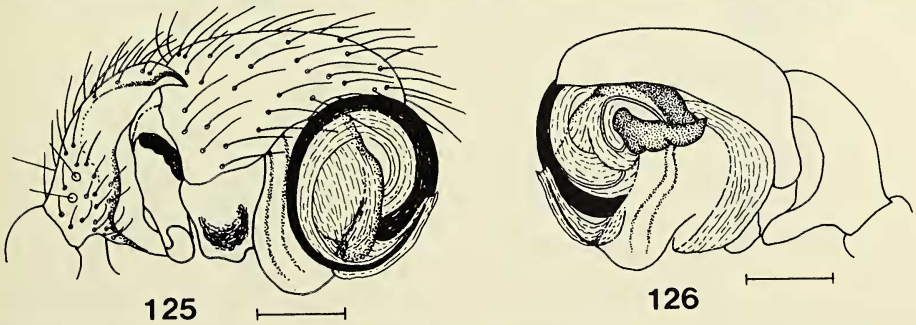
Walckenaeria pallida (Emerton)
Figs. 134, 147, 148, 155, 166, 307; Map 13

Cornicularia pallida Emerton 1882:42; Crosby and Bishop 1931:372 (in part); Roewer 1942:663; (in part); Kaston 1948:167 (in part); Bonnet 1956:1225 (in part).
Walckenaeria (Pseudoprosopotheca) pallida: Wunderlich 1972:383.

In the past, *W. pallida* has not been differentiated from *W. subpallida*, and hence the records given in some of the above papers may not be correct.

Type.–Male and female syntypes from New Haven, New Haven Co., Connecticut, 16 October 1881; in Emerton Collection, MCZ, examined.

Description.–Total length: female 2.3-2.65 mm, male 2.2-2.3 mm. Carapace: length: female 1.1-1.25 mm, male 1.05-1.1 mm. Orange-red, suffused anteriorly with chestnut brown or black to give a striking contrast. In the male the carapace is elevated anteriorly, the form of the elevation being somewhat variable (Figs. 147, 148, 155); the evelation has a dense covering of trifurcate and simple hairs (Fig. 307), and there is a minor cleft in front, above the AM eyes. The pedicel (Fig. 167) is relatively long and sclerotized, and is conspicuous ventrally. Chelicerae: the lateral striae of the female are spaced more or less as in *W. directa*, while in the male they are more widely spaced than in *W. directa.* Abdomen: white or grey-white, darkened posteriorly around the spinners. Sternum: orange with dusky margins, dotted to a variable extent with small pits, each bearing a tiny hair. Legs: orange to yellow; rather slender, with tibia I 1/d 7.5-8 (female), 8-9 (male). TmI: female 0.47-0.52, male 0.50-0.52. Female palp: all segments are darker in color than the



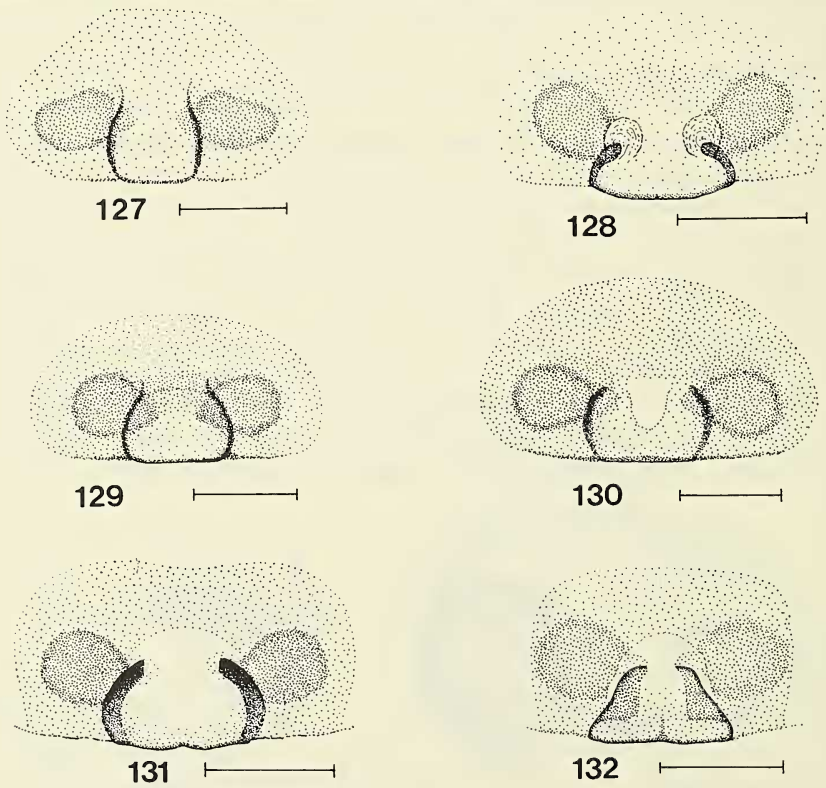
Figs. 125-126.–Male palps. 125, *W. vigilax*, ectal; 126, *W. vigilax*, mesal (Scale lines 0.1 mm).

legs. Male palp: Fig. 134; identical with that of *W. directa.* Epigynum: rather more convex than in *W. directa*, but otherwise not distinguishable.

Diagnosis.—The male of *W. pallida* is diagnosed by the form of the carapace (Figs. 147, 148) and the color. The carapace of *W. subpallida* (Fig. 149) is virtually indistinguishable from that of *W. pallida*, and the males of these two species can be distinguished only by the cheliceral file, which in *W. subpallida* is much more closely spaced than in *W. pallida.* The male of *W. carolina* has the carapace profile rather similar to that of *W. pallida* (Fig. 153 cf. Fig. 147), but the anterior elevation is higher; the cheliceral striae in *W. carolina* male are more widely spaced than in *W. pallida* male, and the membraneous part of the SA in *W. carolina* is shorter, as in *W. brevicornis* (Fig. 135). A further difference lies in the form of the pedicel, which is long and conspicuous in *W. pallida* male, but short and inconspicuous in *W. carolina.* The carapace of *W. prominens* male (Fig. 150) is also rather like that of *W. pallida:* for the separation of these two species, see *W. prominens* diagnosis. The female of *W. pallida* is grouped in the key with *W. subpallida;* these two species can be distinguished only by the cheliceral file, the striae of which are much more closely spaced in *W. subpallida* than in *W. pallida.*

Distribution.—All the records except one are in the eastern half of the continent (Map 13).

Natural History.—Females have been taken in every month except December, males in February, April-June and September-November. Habitats recorded are in woods, in soil and on low vegetation (by sweeping).



Figs. 127-132.—Epigyna. 127.*W. dixiana*; 128, *W. floridiana*; 129, *W. digitata*; 130, *W. maesta*; 131, *W. aurata*; 132, *W. puella* (Scale lines 0.1 mm).

Walckenaeria subpallida, new species
Figs. 149, 158; Map 12

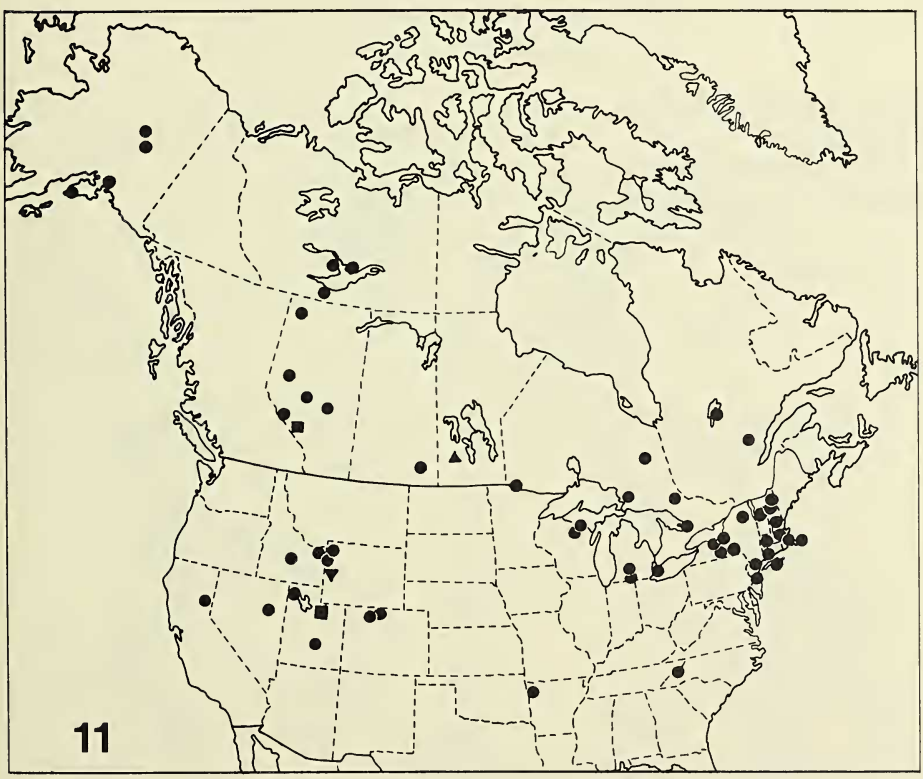
Type.–Male holotype from Neshaminy Creek, 2 miles northeast of Jamison, Pennsylvania, 22 May 1966 (J. and W. Ivie); deposited in AMNH.

Description.–Both sexes were taken together. The species is more or less identical in size, color and genitalia with *W. pallida.* Total length: female 2.5-2.6 mm, male 2.2 mm. Carapace: length: female 1.1-1.2 mm, male 1.05 mm. The anterior elevation in the male (Fig. 149) is sometimes more prominent than in *W. pallida*, and the cleft below the lobe (Fig. 158) is sometimes more pronounced. The pedicel is clearly exposed, as in *W. pallida.* Chelicerae: the lateral striae are closely spaced in both sexes, almost as close as in *W. subdirecta.* Male palp: segments suffused with dark brown or black; palpal organs identical with those of *W. directa.* Epigynum: not distinguishable from that of *W. pallida.*

Diagnosis.–This species is close to *W. pallida*, and its diagnosis is dealt with under that species.

Distribution.–Known only from a few localities in the eastern half of the continent (Map 12).

Natural History.–Adult females have been taken in April-June and October, males in March-June and October. Nothing was recorded on habitat.



Map 11.–North America. Distributions of *W. communis* (circles), *W. prominens* (triangle), *W. subvigilax* (inverted triangle) and *W. pullata* (squares).

Walckenaeria prominens, new species
Figs. 150, 156, 161; Map 11

Type.–Male holotype from near Wasagaming, Riding Mountain National Park, Manitoba, 29 August 1979 (J. and M. Redner); deposited in CNC.

Description.–Only the male is known; its relatively pale color may indicate that the specimen had only just completed its final molt. Total length: male 2.9 mm. Carapace: length: male 1.45 mm. The small lobe or horn (Fig. 156, 161) has a well-defined groove anteriorly, and is covered with numerous spatulate and simple hairs. Chelicerae: the lateral striae are moderately closely spaced. Abdomen: grey-black. Sternum: yellow, with dusky markings. Legs: pale yellow; stouter than in *W. pallida*, with tibia I 1/d ca 6. TmI: male 0.55-0.57. Male palp: indistinguishable from that of *W. directa.*

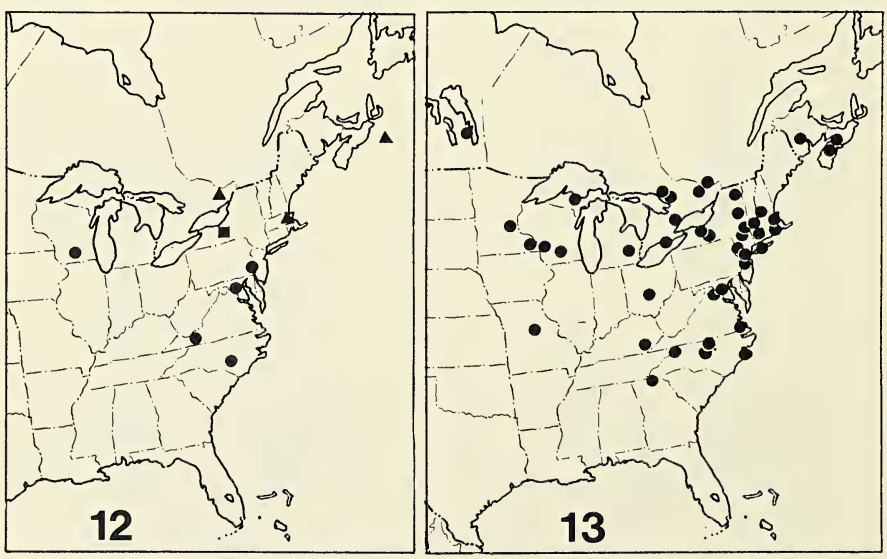
Diagnosis.–The male of *W. prominens* is diagnosed by the form of the carapace lobe (Figs. 150, 156, 161). From in front, this resembles the lobes of *W. pallida* (Fig. 155) and *W. subpallida* (Fig. 158), but the lateral view distinguishes *W. prominens. W. prominens* has a much less striking color than *W. pallida*, and the pedicel is not conspicuous. In addition, the legs of *W. prominens* are stouter than those of *W. pallida* and *W. subpallida: W. prominens* has tibia I 1/d 6, cf. 8.5-9 for *W. pallida/subpallida.*

Distribution.–Known only from the type locality (Map 11).

Natural History.–The male was taken in August, in moss in a boggy area.

Walckenaeria indirecta (O.P.-Cambridge)
Figs. 141, 144; Map 12

Erigone indirecta O.P.-Cambridge 1874:440.
Cornicularia indirecta: Emerton 1882:41; Crosby and Bishop 1931:370; Roewer 1942:663; Kaston 1948:166; Bonnet 1956:1223.
Walckenaeria (Pseudoprosopotheca) indirecta: Wunderlich 1972:383.

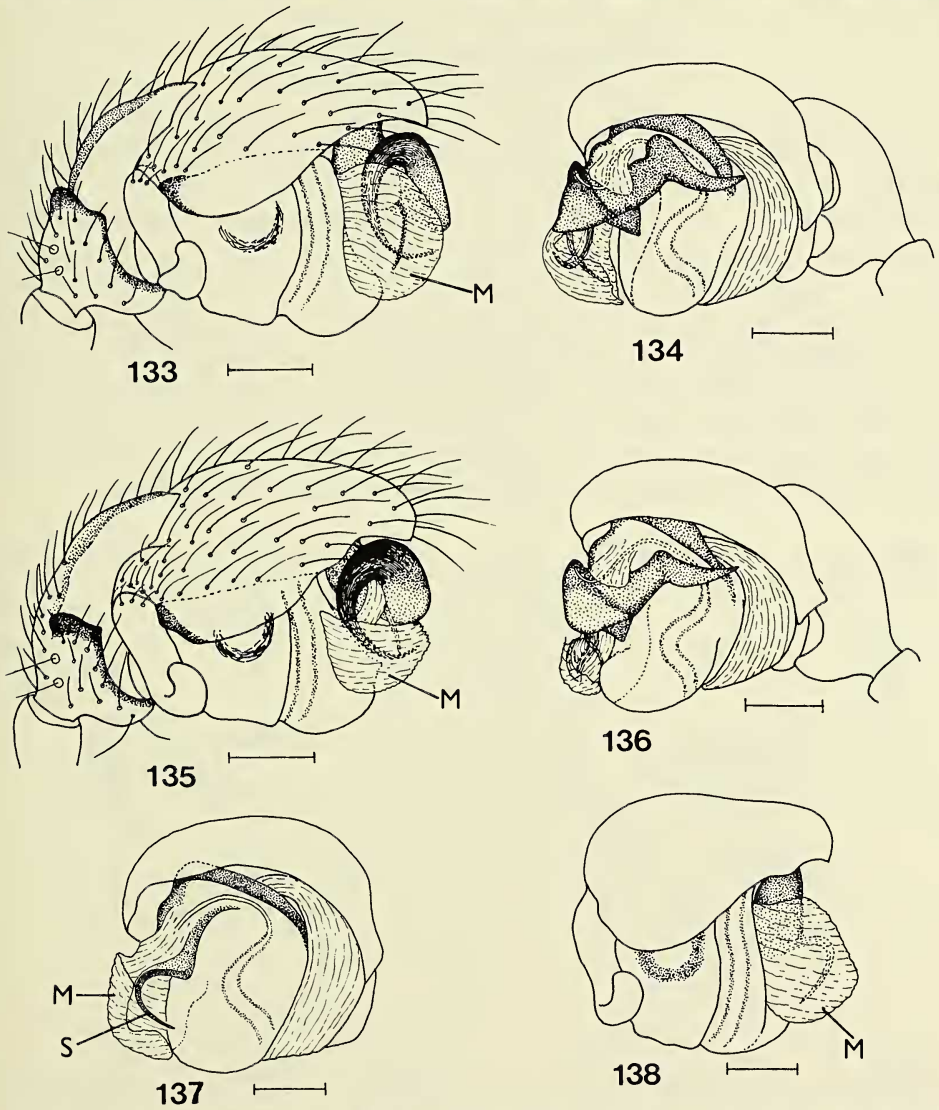


Map 12.–Eastern North America. Distribution of *W. subpallida* (circles), *W. indirecta* (triangles) and *W. breviaria* (square).

Map 13.–Eastern North America. Distribution of *W. pallida* (circles).

Type.–Male and female syntypes in Hope Entomological Collections, Oxford; examined. No type locality is given.

Description.–Total length: female 2.45-3.1 mm, male 2.8 mm. Carapace: length: female 1.0-1.15 mm, male 1.25 mm (excl. horn). Orange to chestnut brown, slightly to heavily darkened anteriorly in female, heavily darkened or black anteriorly in male. The carapace is long and narrow anteriorly, especially in the male. The spatulate hairs on the male horn (Figs. 141, 144) extend almost to the posterior median eyes, and the posterior row of eyes is strongly procurved. The pedicel is conspicuous ventrally, though perhaps rather less so than in *W. pallida* (Fig. 167). Chelicerae: the lateral striae are spaced more or less as in *W. directa* in the female, but rather more widely spaced in the male. Abdomen: grey. Sternum: orange, with dusky margins: a few minute pits are



Figs. 133-138.–Male palps. 133, *W. directa*, ectal; 134, *W. pallida*, mesal; 135, *W. brevicornis*, ectal; 136, *W. carolina*, mesal; 137, *W. directa*, mesal, ED removed; 138, *W. directa*, ectal, ED removed. Abbreviations: M, membraneous part of SA; S, sickle-shaped end of SA (Scale lines 0.1 mm).

sometimes present. Legs: femora orange, remaining segments brown. TmI: female 0.60-0.70, male 0.60-0.62. Female palp: tibia and tarsus darkened. Male palp: not distinguishable from that of *W. directa*. Epigynum: not distinguishable from that of *W. directa*.

Diagnosis.—The male of *W. indirecta* is diagnosed by the form of the horn, the procurved posterior eyes and the long pedicel (see *W. directa* diagnosis). The female has a long pedicel as in *W. directa/subpallida*, and is separated from these species by the darker colored abdomen and the stouter legs.

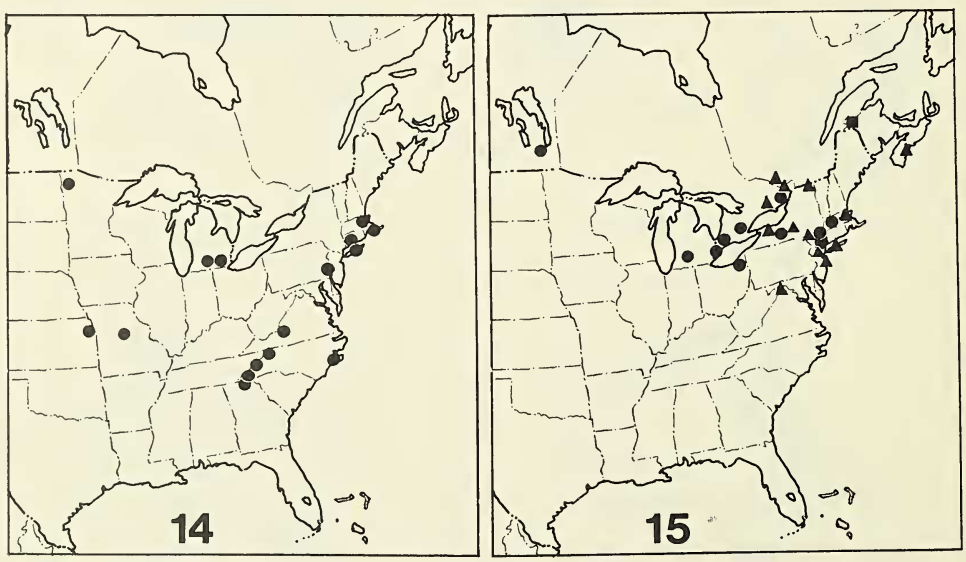
Distribution.—*W. indirecta* appears to be a rare species; apart from the types, I have seen authentic specimens from three localities only in the north-east (Map 12).

Natural History.—Adults of both sexes have been taken in May-June; the only locality recorded is in a sphagnum bog.

Walckenaeria oregona, new species
Figs. 154, 160, 163, 171; Map 10

Type.—Male holotype from Corvallis, Benton Co., Oregon, 7 March 1949 (V. Roth); deposited in AMNH.

Description.—The two sexes were taken together. Total length: female 2.8-3.0 mm, male 2.5-2.6 mm. Carapace: length: female 1.1-1.15 mm, male 1.2 mm. Orange, with faint dusky markings. Male carapace raised anteriorly into a small lobe with a distinct cleft beneath (Figs. 154, 160); the lobe has two longitudinal rows of spatulate hairs (Fig. 163). Chelicerae: lateral striae widely spaced in female, rather less widely spaced in male. Abdomen: grey to black. Sternum: orange to orange-brown. TmI: female 0.55-0.60, male 0.53-0.55. Female palp: tibia and tarsus darker than the legs. Male palp: palpal organs not distinguishable from those of *W. directa*, but the palpal tibia shows minor differences (Fig. 171 cf. Fig. 168). Epigynum: not distinguishable from that of *W. directa*.



Map 14.—Eastern North America. Distribution of *W. brevicornis* (circles).

Map 15.—Eastern North America. Distribution of *W. tibialis* (circles), *W. tumida* (triangles) and *W. teres* (square).

Diagnosis.–The male of *W. oregona* is diagnosed by the form of the male carapace (Figs. 154, 160); this bears some resemblance to that of *W. pallida*, but the cleft beneath the lobe is much more pronounced. The coloration of *W. oregona* is also quite different form that of *W. pallida.* The female of *W. oregona* is grouped in the key with *W. directa* and *W. subdirecta;* the separation of these three species is based on the spacing of the cheliceral striae (see *W. directa* diagnosis).

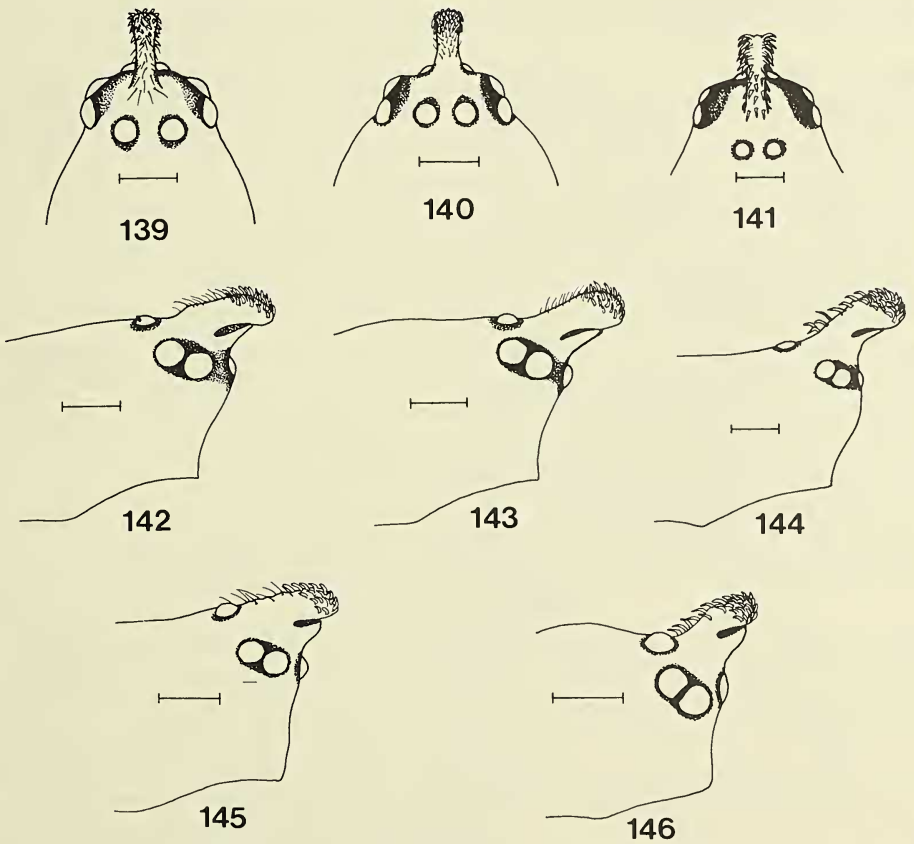
Distribution.–Recorded from Oregon and Washington only (Map 10).

Natural History.–Adult females have been taken in all months except June, August and October, males in February, March, and September and November. The only habitat recorded was in fir needles.

Walckenaeria dondalei, new species
Figs. 151, 157, 162; Map 9

This species is named in honor of C. D. Dondale, who has been responsible for the capture of a number of the new *Walckenaeria* species described in this paper.

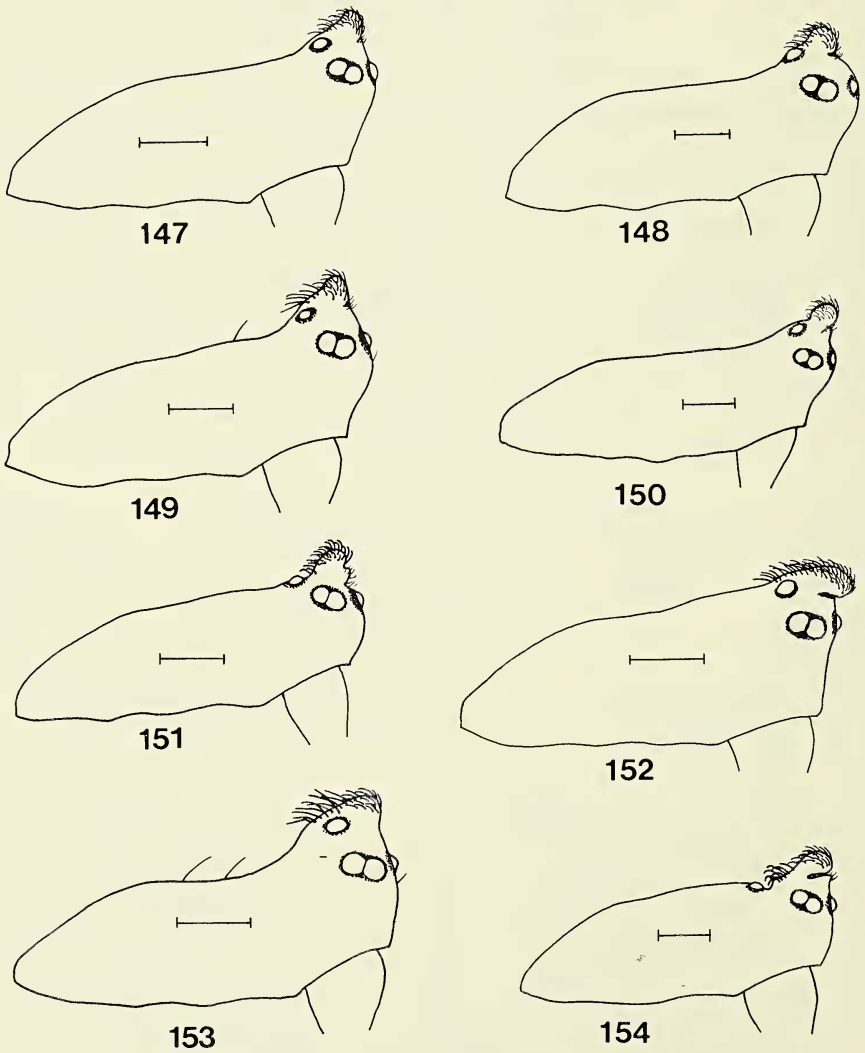
Type.–Male holotype from Chatterton, 13 miles north of Belleville, Ontario, 22 April 1969 (C. D. Dondale); deposited in CNC.



Figs. 139-146.–Male carapaces. 139, *W. directa*, dorsal; 140, *W. communis*, dorsal; 141, *W. indirecta*, dorsal; 142, *W. directa*, lateral; 143, *W. communis*, lateral; 144, *W. indirecta*, lateral; 145, *W. breviaria*, lateral; 146, *W. tibialis*, lateral (Scale lines 0.1 mm).

Description.—The female was taken at the type locality, but not with a male. Total length: female/male 2.2-2.55 mm. Carapace: length: female 1.0-1.05 mm, male 1.1-1.15 mm. Brown to deep chestnut brown, with dusky markings; lightly darkened anteriorly in female. The male carapace has a fairly large lobe (Figs. 151, 157, 162) which bears numerous spatulate hairs. Chelicerae: the lateral striae are moderately spaced in the female, approximately as in *W. directa*, and fairly closely spaced in the male. Abdomen: grey-black with faint paler markings. Sternum: orange, with blackish margins; a few tiny pits are sometimes present. Legs: yellow to orange. TmI: female 0.50-0.57, male 0.50-0.53. Male palp: the tibia and palpal organs are identical with those of *W. directa.* Epigynum: indistinguishable from that of *directa.*

Diagnosis.—The male of *W. dondalei* is diagnosed by the form of the carapace (Figs. 151, 162). Viewed laterally, the horn is fairly similar to those of *W. pallida, W. prominens*



Figs. 147-154.—Male carapaces, lateral. 147, *W. pallida*; 148, *W. pallida*, another specimen; 149, *W. subpallida*; 150, *W. prominens*; 151, *W. dondalei*; 152, *W. brevicornis*; 153, *W. carolina*; 154, *W. oregona* (Scale lines 0.2 mm).

and *W. oregona;* from in front, however, the horn is seen to be forked, which is not the case with these three species. (Fig. 162 cf. Figs. 155, 161, 163). The female of *W. dondalei* is grouped with *W. brevicornis* and *W. communis* in the key. *W. dondalei* female may be separable from *W. communis* by the darkening of the anterior leg segments in this latter species, and by the slightly different carapace profile, but these differences may be small (see *W. communis* diagnosis); distinction from *W. brevicornis* is possible only when the specimen of the latter species has the epigynum of the form shown in Fig. 176.

Distribution.–Known only from the type locality (Map 9).

Natural History.–Adult females were taken in May and October, males in September and October, in a meadow (pitfall).

Walckenaeria brevicornis (Emerton)
Figs. 135, 152, 165, 169, 176; Map 14

Cornicularia brevicornis Emerton 1882:42; Crosby and Bishop 1931:363; Roewer 1942:662; Kaston 1948:167; Bonnet 1956:1221.
Walckenaeria (Pseudoprosopotheca) brevicornis: Wunderlich 1972:383.

Type.–Male holotype from New Haven, New Haven Co., Connecticut, 14 November 1880; in Emerton Collection, MCZ, examined.

Description.–Total length: female 2.3-2.5 mm, male 2.15-2.25. Carapace: length: female/male 1.0-1.05 mm. Orange to chestnut brown, with faint dusky markings and margins; somewhat darkened anteriorly. The horn on the male carapace (Fig. 152) is short and blunt, with a clear fissure beneath, and clothed with the usual spatulate and simple hairs. Chelicerae: the lateral striae in the female are marginally more closely spaced than in *W. directa*, and in the male are spaced more or less as in *W. directa.* Abdomen: grey to black, sometimes paler anteriorly in the female; pale chevrons are sometimes visible, especially posteriorly. Sternum: shiny orange, with dusky margins. Legs: orange to pale orange. TmI: female 0.46-0.50, male 0.50-0.52. Female palp: tibia and tarsus usually darkened. Male palp: Figs. 135, 169; the membraneous sheet of the SA is smaller than in *W. directa*, covering less of the embolus on the ectal side (M, Fig. 135, cf. Fig. 133), and the lateral tibial apophysis is slightly shorter (Fig. 169 cf. Fig. 168). The anterior end of the ED is blunt, as in *W. carolina* (Fig. 136), not pointed, as in *W. pallida* (Fig. 134) and *W. directa.* Epigynum: Fig. 176; not all specimens have the convergent dark lines extending from the posterior area so clearly marked, and in such cases the epigynum is indistinguishable with certainty from that of *W. directa* (Fig. 175) and other species in this group.

Diagnosis.–The male of *W. brevicornis* is diagnosed by the form of the horn (Fig. 152), which is short and blunt. The horn is somewhat similar to that of *W. breviaria:* see *W. breviaria* diagnosis. The female of *W. brevicornis* is grouped with *W. communis* and *W. dondalei* in the key, and separation of the females of these three species is often unreliable: see *W. communis* and *W. dondalei* diagnoses.

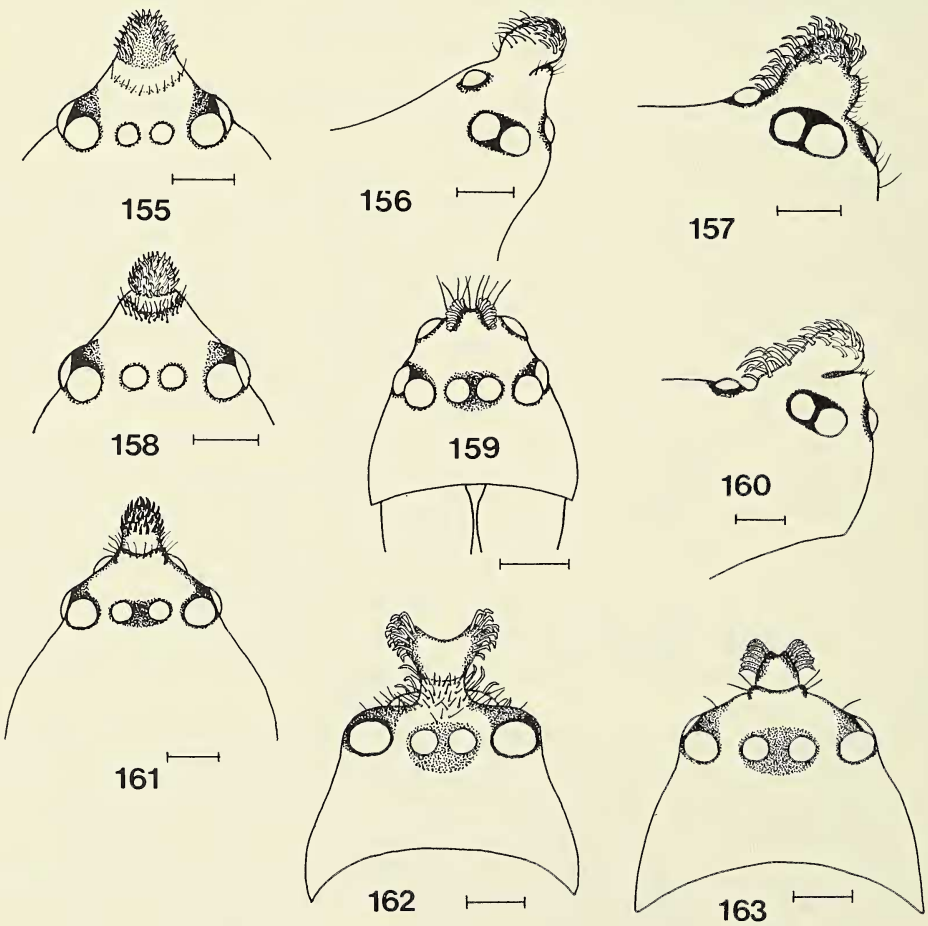
Distribution.–*W. brevicornis* seems to be limited to the eastern part of the continent (Map 14). It has not been recorded from Canada.

Natural History.–Adult females have been taken in April-June and September-November, males in January-May and October-November. Nothing is recorded on habitat. Both sexes were taken in September, on a fence, presumably about to aeronaut.

Walckenaeria carolina, new species
Figs. 136, 153, 159, 166, 170, 177; Map 10

Type.–Male holotype from Duke Forest, Durham Co., North Carolina, 6 February 1964, at 1500 ft. (J. W. Berry); deposited in MCZ.

Description.–Both sexes have been taken at the type locality, but at different times. Total length: female 2.4-2.9 mm, male 2.2-2.35 mm. Carapace: length: female 1.1 mm, male 1.0 mm. Glossy orange-red to chestnut brown, with blackish margins; not significantly darkened anteriorly. The carapace is raised anteriorly in the female (Fig. 166), and more so in the male (Figs. 153, 159); the elevation in the male is clothed with the usual spatulate and simple hairs. Chelicerae: the lateral striae are more widely spaced than in *W. pallida* in both sexes. Abdomen: grey. Sternum: shiny orange, with blackish margins. Legs: orange to yellow. TmI: female 0.51-0.57, male 0.50. Male palp: Figs. 136, 170. The ED is not pointed anteriorly, and the membraneous sheet of the SA is short like that of *W. brevicornis* (FIg. 135); the palpal tibia has the long apophysis rather shorter than in *W. brevicornis* (Fig. 170 cf. Fig. 169). Epigynum: Fig. 177. Although the carapace of this



Figs. 155-163.–Male carapaces. 155, *W. pallida*, in front; 156, *W. prominens*, lateral; 157, *W. dondalei*, lateral; 158, *W. subpallida*, in front; 159, *W. carolina*, in front; 160, *W. oregona*, lateral; 161, *W. prominens*, in front; 162, *W. dondalei*, in front; 163, *W. oregona*, in front (Scale lines 0.1 mm).

species is reminiscent of *W. pallida*, the form of the male palp shows that it is more closely related to *W. brevicornis*.

Diagnosis.–The male of *W. carolina* is diagnosed by the form of the carapace (Fig. 153), and is dealt with under *W. pallida* diagnosis. The female is grouped with *W. directa*, *W. subdirecta* and *W. oregona* in the key; it is readily separated from these species by the epigynum (Fig. 177), and by the more sharply raised carapace (Fig. 166).

Distribution.–Known only from a few mid-eastern areas of the continent (Map 10).

Natural History.–Adult females have been taken in April, May and October, males in February and October. The type was taken in young pines (pitfall) at ca. 450 m.

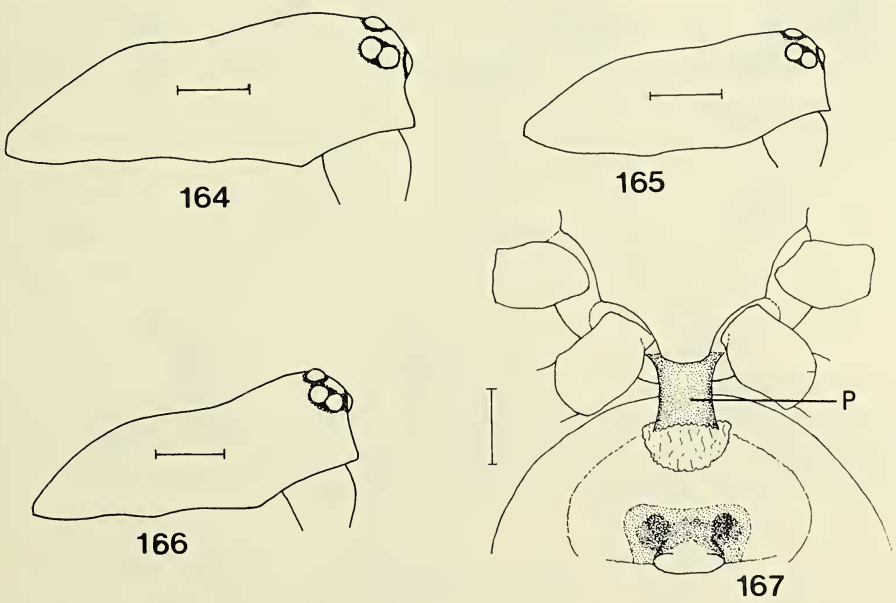
tibialis Group

This group contains only three species, and diagnosis is relatively easy on the basis of the male palpal tibiae and the female epigyna.

Walckenaeria tibialis (Emerton)
Figs. 146, 172, 179, 182, 184; Map 15

Cornicularia tibialis Emerton 1882:41; Crosby and Bishop 1931:373; Roewer 1942:664; Kaston 1948:167; Bonnet 1956:1225.
Walckenaeria (Pseudoprosopotheca) tibialis: Wunderlich 1972:383.

Type.–Male and female syntypes form Mt. Tom, Hampshire Co., near Holyoke, Hampden Co., Massachusetts, 4 April 1878; in Emerton Collection, MCZ, examined.



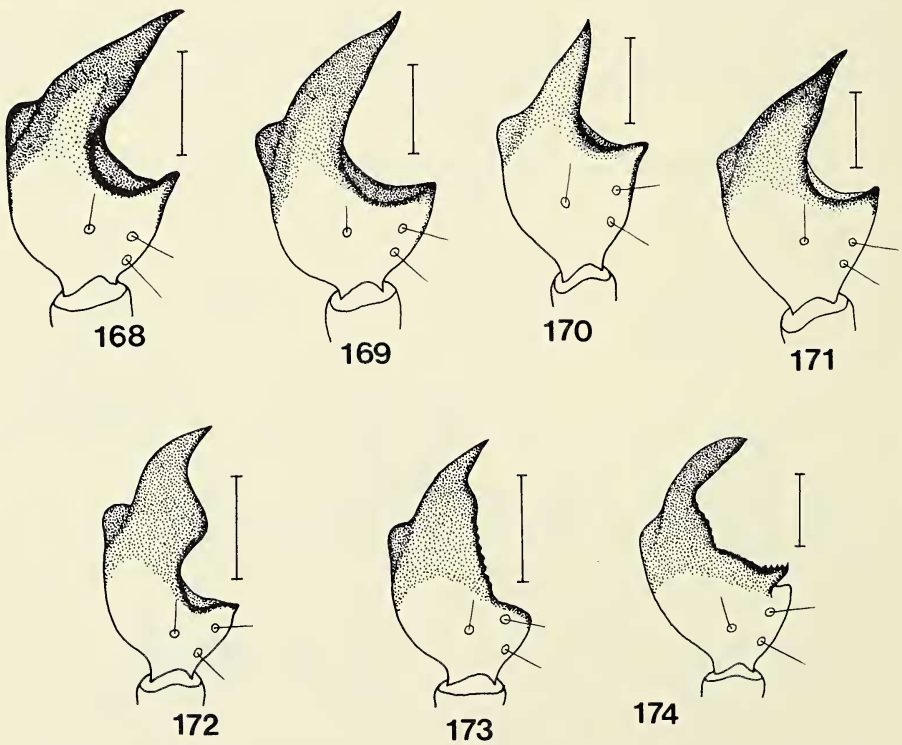
Figs. 164-167.–164, *W. communis*, female carapace, lateral; 165, *W. brevicornis*, female carapace, lateral; 166, *W. carolina*, female carapace, lateral; 167, *W. pallida*, female, pedicel. Abbreviation: P, pedicel (Scale lines 0.2 mm).

Description.—Total length: female 1.9 mm, male 1.8-1.9 mm. Carapace: length: female 0.85-0.90, male 0.80-0.90 (excl. horn). Deep chestnut brown. The male has a stout horn anteriorly (Fig. 146); the length of the horn is somewhat variable. There is a clump of stout spatulate hairs between the base of the horn and the posterior eyes. Lines of minute pits radiating from the fovea are sometimes visible in the male. Chelicerae: the lateral striae are fairly widely spaced in both sexes. Abdomen: black. Sternum: orange to deep brown, with blackish margins; the surface is marked with numerous tiny pits. Legs: orange to deep brown. TmI: female 0.40, male 0.38-0.42. Male palp: Figs. 172, 182, 184. Epigynum: Fig. 179.

Diagnosis.—*W. tibialis* male is diagnosed by the carapace horn (Fig. 146), which is of the same type as in *W. directa* but shorter and more erect, coupled with the form of the palp, particularly of the SA (Figs. 182, 184) and of the palpal tibia (Fig. 172). *W. tumida* and *W. teres* have the carapace horn and the palpal organs more or less identical with those of *W. tibialis*, but are readily distinguished by the forms of the palpal tibiae (Figs. 173, 183: 174, 185 cf. 172, 182). *W. tibialis* female is diagnosed by the epigynum (Fig. 179); this is very like that of *W. tumida* (Fig. 180), but the spermathecae are rather smaller and set less far forwards.

Distribution.—Most of the records are from the northeastern states of U.S.A. and from Ontario, but there is one record from Manitoba (Map 15).

Natural History.—Adult females have been taken in April and July, males in April, May and December. Habitats recorded are in a cornfield, at the edge of moist woods and under a rock.



Figs. 168-174.—Male palpal tibiae, dorsal. 168, *W. directa*; 169, *W. brevicornis*; 170, *W. carolina*; 171, *W. oregona*, 172, *W. tibialis*; 173, *W. tumida*; 174, *W. teres* (Scale lines 0.1 mm).

Walckenaeria tumida (Crosby and Bishop)
Figs. 173, 180, 181, 183; Map 15

Cornicularia tumida Crosby and Bishop 1931:374; Roewer 1942:664; Bonnet 1956:1225.
Walckenaeria (Pseudoprosopotheca) tumida: Wunderlich 1972:383.

Type.–The male holotype (Little Pond, Orange Co., New York, 25 May 1920) cannot be found in AMNH; there is however one male, determined by Crosby and Bishop, in the AMNH collection.

Description.–Total length: female 1.55 mm, male 1.40-1.55 mm. Carapace: length: female 0.7 mm, male 0.65-0.7 mm. Brown to deep brown. The male horn is as in *W. tibialis*. Chelicerae: the lateral striae are fairly widely spaced in both sexes. Abdomen: grey. Sternum: brown, with blackish margins; pitted to a smaller extent than in *W. tibialis*. Legs: orange-brown. TmI: female 0.40, male 0.40-0.45. Male palp: Figs. 173, 183. Epigynum: Fig. 180; the epigynum is very small, and the full detail of the internal genitalia (Fig. 181) could not be seen.

Diagnosis.–See *W. tibialis* diagnosis.

Distribution.–This is very similar to that of *W. tibialis* (Map 15)

Natural History.–Adult females have been taken in April-August and in October, males in March-June, September and "winter/spring". Habitats recorded are in sphagnum bog, in sphagnum fen and in an oak stand.

Walckenaeria teres, new species
Figs. 174, 185; Map 15

Type.–Male holotype from Green River, 30 miles north of Edmunston, New Brunswick, 6 June 1961 (T. R. Renault); deposited in CNC.

Description.–Only the male is known. Total length: male 2.0-2.1 mm. Carapace: length: male 0.90-1.0 mm. Chestnut brown with dusky markings. The male horn is as in *W. tibialis*. Chelicerae: the lateral striae are moderately widely spaced. Abdomen: grey-black. Sternum: orange, with margins dusky; the surface is marked with numerous small pits. Legs: orange brown. TmI: male 0.50. Male palp: Figs. 174, 185.

Diagnosis.–See *W. tibialis* diagnosis.

Distribution.–Known only from the type locality (Map 15).

Natural History.–The adult males were taken in June, by beating.

tricornis Group

The males of this group have closely similar palpal organs, but can be diagnosed by the form of the palpal tibiae. The females of several of the species have virtually identical epigyna, and, unless the female is taken with a male, diagnosis to species level is sometimes impossible.

Partial keys to species

Males

1. Palpal tibia as Figs. 194, 195, with lateral bulge. . . . . .*tricornis, palustris* (see species descriptions)
   Palpal tibia with a distinct lateral apophysis 2

2. Lateral apophysis small (Figs. 196, 197 3
   Lateral apophysis larger (Figs. 198-202). 4

3. Lateral apophysis narrow (Fig. 196); carapace lobe constricted (Fig. 189) . . . . . .*bifida*
   Lateral apophysis broad (Fig. 197); carapace lobe scarcely constricted. . . . . *serrata*

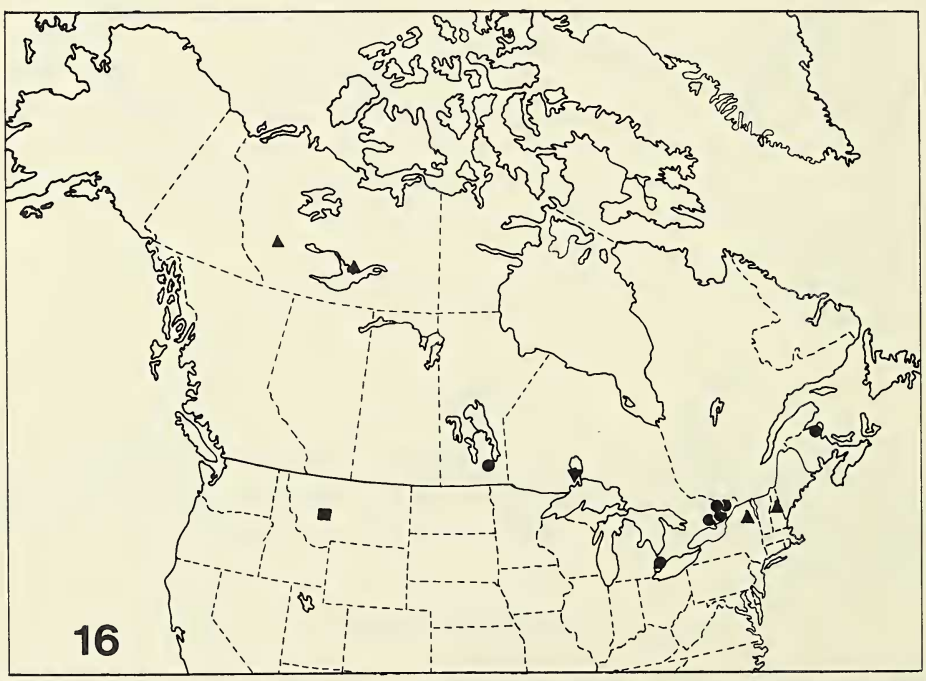
4. Carapace lobe distinctly constricted (Fig. 191) . . . . . .*occidentalis*
   Carapace lobe scarcely constricted (Fig. 192) . . . . . .*helenae, reclusa, septentrionalis, columbia* (see species descriptions)

Females

1. Epigynum as Figs. 203, 204, 206-208 . . . . . .*palustris, aprilis, solivaga, anceps* (see species descriptions)
   Epigynum as Figs. 209-211 . . . . . *weber, occidentalis, helenae, reclusa, septentrionalis, columbia* (see species descriptions)

Walckenaeria tricornis (Emerton)
Figs. 186, 190, 194; Map 16

Cornicularia tricornis Emerton 1882:43.
Tigellinus tricornis: Crosby and Bishop 1931:377; Roewer 1942:667; Bonnet 1959:4621.
Walckenaeria (Pseudotigellinus) tricornis: Wunderlich 1972:391.



Map 16.–North America. Distributions of *W. palustris* (circles), *W. tricornis* (triangles), *W. anceps* (inverted triangle) and *W. helenae* (square).

Type.–Male holotype from Mt. Washington, Coos Co., New Hampshire, 10 June 1877; in Emerton Collection, MCZ, examined.

Description.–Only the male is known. Total length: male 1.5-1.75 mm. Carapace: length: male 0.70-0.75 mm. Orange to deep brown, with dusky markings; the lobe is well constricted behind the anterior fork (Fig. 190). Chelicerae: lateral striae fairly closely spaced. Abdomen: grey to black. Sternum: orange to brown. Legs: orange to brown. TmI: male 0.39-0.41. Male palp: Figs. 186, 194; the tibia and tarsus are dark in color.

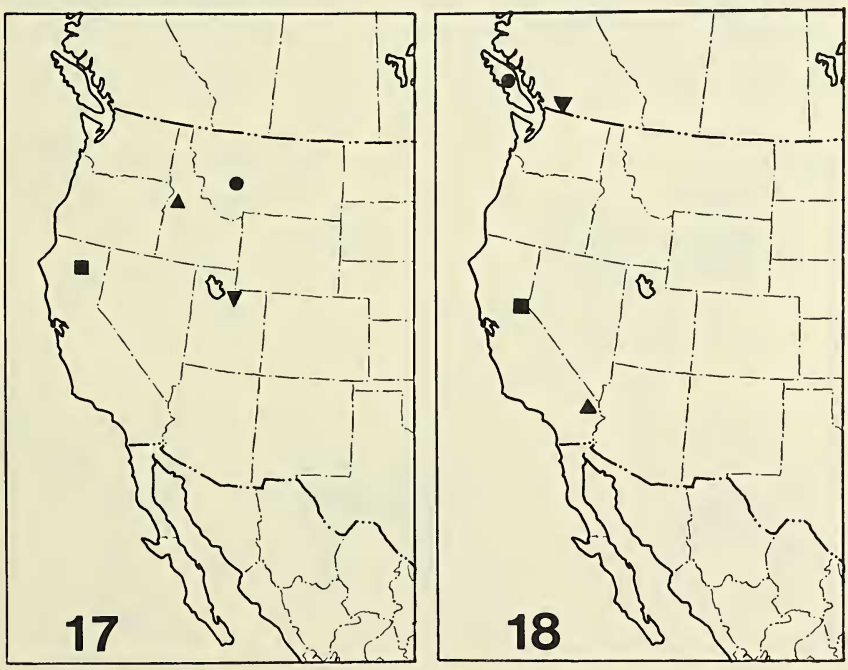
Diagnosis.–The male of *W. tricornis* is diagnosed by the form of the palpal tibia (Fig. 194) and the palpal organs (Fig. 186), coupled with the form of the carapace lobe (Fig. 190). The palpal tibia is of the same pattern as that of *W. palustris* (Fig. 195), but this species has the tibia wider in the mid-section and less indented; in addition, the lobe of *W. palustris* is narrower anteriorly than that of *W. tricornis* (Fig. 193 cf. Fig. 190).*W. tricornis* seems to be the only species in this group which has a barb-shaped termination to the embolus (Fig. 186).

Distribution.–*W. tricornis* is recorded from high ground in the northeastern U.S.A. and from Northwest Territories (Map 16).

Natural History.–Adult males have been taken in June and August. The only locality recorded is in moss.

Walckenaeria palustris, new species
Figs. 193, 195, 203, 205, 206; Map 16

Type.–Male holotype from Mer Bleue, east of Ottawa, Ontario, 14 May-9 June 1975 (Dondale and Redner); deposited in CNC.



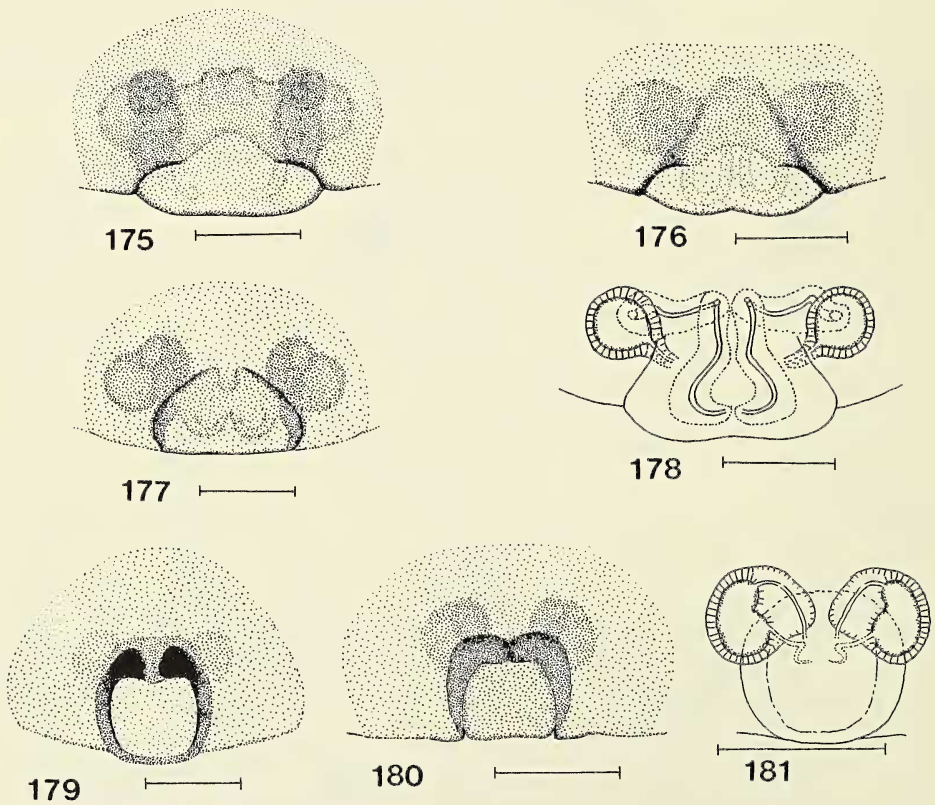
Map 17.–Western North America. Distributions of *W. solivaga* (circle), *W. reclusa* (triangle), *W. weber* (inverted triangle) and *W. serrata* (square).

Map 18.–Western North America. Distributions of *W. septentrionalis* (circle), *W. occidentalis* (triangle), *W. columbia* (inverted triangle) and *W. bifida* (square).

Description.—Both sexes have been taken together. Total length: female 1.55-1.75 mm, male 1.45-1.55 mm. Carapace: length: female 0.60-0.65 mm, male 0.55-0.65 mm. Brown, with dusky markings and margins. The male lobe (Fig. 193) is constricted behind the fork. Chelicerae: lateral striae closely spaced in both sexes. Abdomen: grey-black. Sternum: yellow-brown, with dusky margins. Legs: brown to orange-brown. TmI: female/male 0.40-0.43. Male palp: Fig. 195. Epigynum: Figs. 203, 205, 206. The width and shape of the central area shows some variation; the female from Manitoba, which I take to be this species, has the central area narrower than in the specimens from Ontario.

Diagnosis.—The male is diagnosed by the form of the palpal tibia (Fig. 195) and of the carapace lobe (Fig. 193); this species is close to *W. tricornis*, and the features distinguishing the males of these two species are dealt with under *W. tricornis* diagnosis. The female of *W. palustris* is diagnosed by the epigynum (Figs. 203, 206); this is generally similar to those of *W. aprilis* (Fig. 204), *W. solivaga* (Fig. 207) and *W. anceps* (Fig. 208), but the epigyna of the two latter species are sufficiently different from that of *W. palustris* to make confusion unlikely. *W. palustris* is distinguished from *W. aprilis* by the larger size of the epigynum and closer spacing of the cheliceral striae in the latter species, and by the proportions of the legs (MTI/tI in *W. palustris* ca. 1.15, in *W. aprilis* ca. 1.4); the geographical distribution should also be taken into consideration.

Distribution.—The species is known only from southern Canada (Map 16).



Figs. 175-181.—Epigyna, ventral. 175, *W. directa*; 176, *W. brevicornis*; 177, *W. carolina*; 178, *W. directa*, internal genitalia, cleared; 179, *W. tibialis*; 180, *W. tumida*, 181, *W. tumida*, internal genitalia, cleared (Scale lines 0.1 mm).

Natural History.–Adults of both sexes have been taken in May-July. Habitats recorded are sphagnum bog, meadow, prairie grass, and amongst pines on sand dunes.

Walckenaeria aprilis, new species
Fig. 204; Map 19

Type.–Female holotype form 3 miles west of Forest, Scott Co., Mississippi, 11 April 1963 (W. J. Gertsch and W. Ivie); deposited in AMNH.

Description.–Only the female is known. Total length: female 1.4 mm. Carapace: length: female 0.65 mm. Orange, with dusky margins. Chelicerae: lateral striae very closely spaced. Abdomen: black. Sternum: orange-yellow, with blackish margins. Legs: orange. TmI: female 0.38. Epigynum: Fig. 204.

Diagnosis.–*W. aprilis* female is diagnosed by the epigynum (Fig. 204); this is of the same general form as in *W. palustris* (Fig. 203), *W. solivaga* (Fig. 207) and *W. anceps* (Fig. 208). From the two latter species, *W. aprilis* is distinguished by the shape of the epigynum; the separation from *W. palustris* is dealt with under that species.

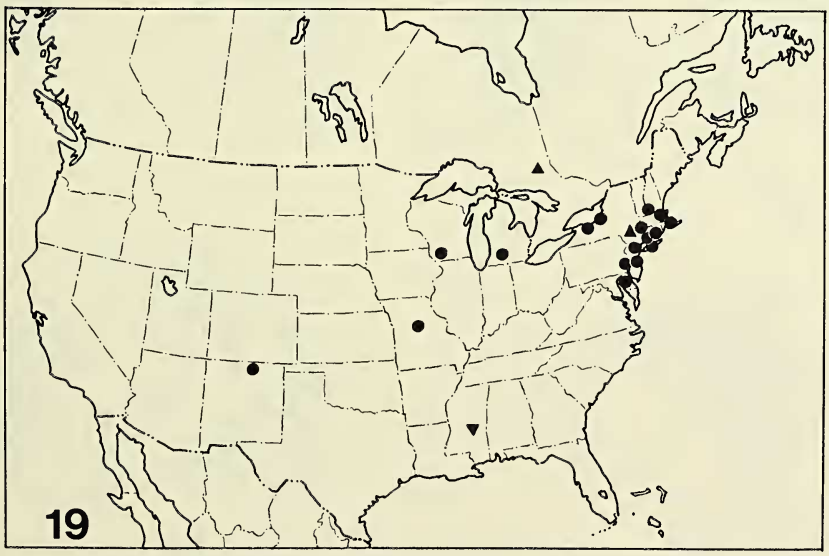
Distribution.–Known only from the type locality (Map 19).

Natural history.–The female was taken adult in April; nothing was recorded on habitat.

Walckenaeria solivaga, new species
Fig. 207; Map 17

Type.–Female holotype from Last Chance Gulch, Helena, Lewis and Clark Co., Montana, 3 October 1964 (J. and W. Ivie); deposited in AMNH.

Description.–Only the female is known. Total length: female 2.2 mm. Carapace: length: female 0.85 mm. Orange, with faint dusky markings and margins. Chelicerae:



Map 19.–North America. Distributions of *W. minuta* (circles), *W. tenella* (triangles) and *W. aprilis* (inverted triangle).

lateral striae moderately spaced. Abdomen: grey. Sternum: orange, with dusky margins. Legs: orange. TmI: female 0.42-0.45 mm. Epigynum: Fig. 207. This species may possibly be *Tigellinus perditus* Chamberlin (1948), but in the absence of any specimens of Chamberlin's species it is impossible to come to any valid conclusion on this possibility.

Diagnosis.—*W. solivaga* female is diagnosed by th epigynum (Fig. 207); in the single specimen known, this epigynum is distinguishable from those of *W. palustris* (Fig. 203) and *W. aprilis* (Fig. 204), but that of *W. anceps* (Fig. 208) is closely similar. *W. solivaga* and *W. anceps* are separable by the significantly smaller size of *W. anceps*, and by the proportions of the legs (MTI/tI in *W. solivaga* is 1.35, in *W. anceps* is 1.1).

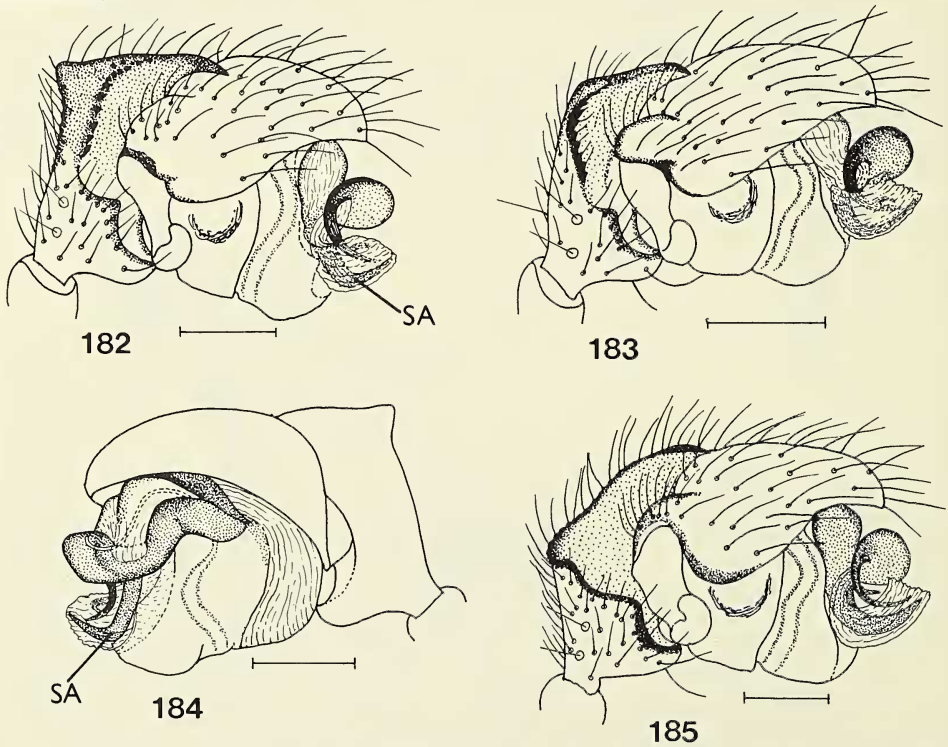
Distribution.—Known only from the type locality (Map 17).

Natural History.—The female was taken adult in October; nothing was recorded on habitat.

Walckenaeria anceps, new species
Fig. 208; Map 16

Type.—Female holotype from 17 miles north of Black Sturgeon Lake, Ontario, 13 August 1972 (E. Lindquist); deposited in CNC.

Description.—Only the female is known. Total length: female 1.65 mm. Carapace: length: female 0.70 mm. Orange, with faint dusky markings. Chelicerae: lateral striae closely spaced. Abdomen: grey. Sternum: orange, with dusky margins. Legs: pale orange. TmI: female 0.40. Epigynum: Fig. 208. It is possible that this is the unknown female of *W. tricornis.*



Figs. 182-185.—Male palps. 182. *W. tibialis*, ectal; 183, *W. tumida*, ectal; 184, *W. tibialis*, mesal; 185, *W. teres*, ectal. Abbreviation: SA, suprategular apophysis (Scale lines 0.1 mm).

Diagnosis.–*W. anceps* female is diagnosed by the epigynum (Fig. 208), which has a wide central area covered by an integument of glassy appearance. *W. solivaga* has the epigynum (Fig. 207) very similar to that of *W. anceps*, though relatively not quite so broad: see *W. solivaga* diagnosis.

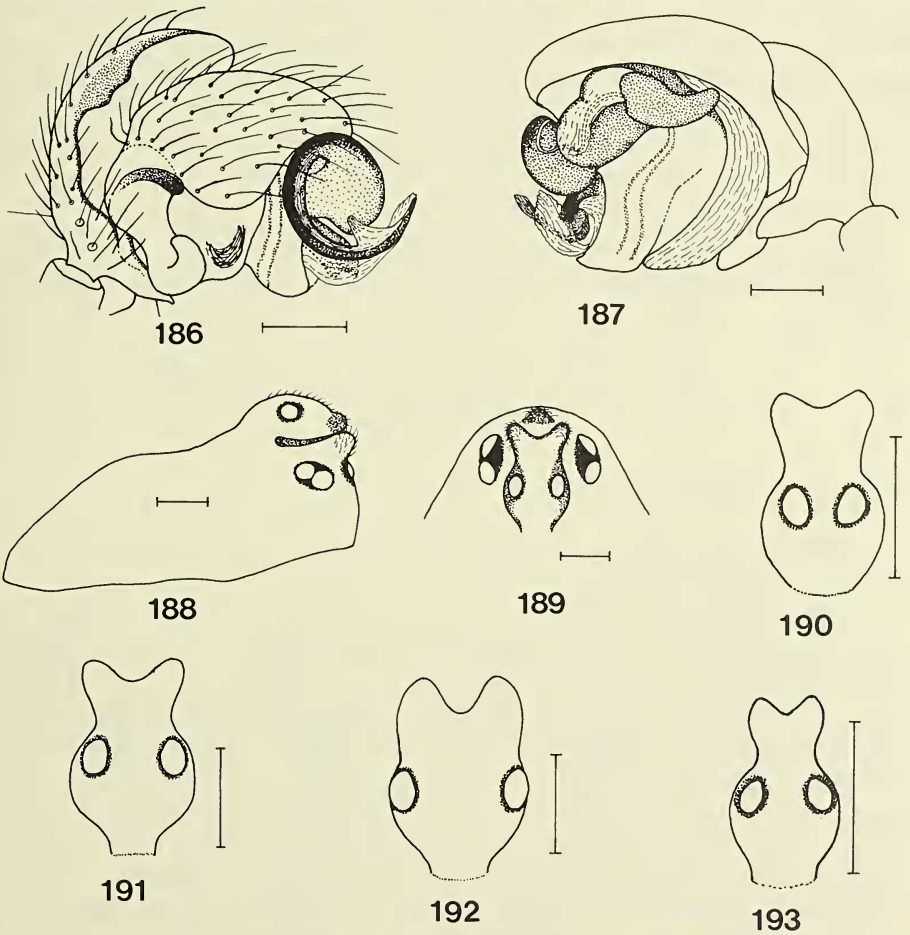
Distribution.–Known only from the type locality (Map 16).

Natural History.–The female was taken adult in August, in conifer litter and moss.

Walckenaeria bifida, new species
Figs. 188, 189, 196; Map 18

Type.–Male holotype from Johnsville, Plumas Co., California, 25 October 1959 (J. S. Buckett); deposited in AMNH.

Description.–Only the male is known. Total length: male 1.60 mm. Carapace: length: male 0.70 mm. Orange-brown. The lobe (Fig. 188) is constricted in front of the eyes (Fig. 189). Chelicerae: the lateral striae are fairly closely spaced. Abdomen: black. Sternum:



Figs. 186-193.–186, *W. tricornis*, male palp, ectal; 187, *W. reclusa*, male palp, mesal; 188, *W. bifida*, male carapace, lateral, 189, *W. bifida*, male carapace, dorsal; 190, *W. tricornis*, male lobe, dorsal; 191, *W. occidentalis*, male lobe, dorsal, 192, *W. reclusa*, male lobe, dorsal; 193, *W. palustris*, male lobe, dorsal (Scale lines 0.1 mm).

orange, with dusky margins. Legs: orange. TmI: male 0.48. Male palp: Fig. 196; the lateral tibial apophysis is tiny and bifid at the tip.

Diagnosis.—The male of *W. bifida* is diagnosed by the form of the palpal tibia (Fig. 196); the lateral tibial apophysis is significantly smaller and narrower than in the other species in the *tricornis* group.

Distribution.—Known only from the type locality (Map 18).

Natural History.—The type male was adult in October; nothing was recorded on habitat.

Walckenaeria serrata, new species
Fig. 197; Map 17

Type.—Male holotype from 3 miles ENE of Manzanita Lake, Shasta Co., California, 16 September 1965 (J. and W. Ivie); deposited in AMNH.

Description.—Only the male is known. Total length: male 2.05 mm. Carapace: length: male 0.80 mm. Orange, with dusky markings and margins. The lobe is broad and not much constricted (as Fig. 192). Chelicerae: the lateral striae are moderately closely spaced. Abdomen: black. Sternum: orange, with dusky margins. Legs: orange. TmI: male 0.40. Male palp: Fig. 197.

Diagnosis.—*W. serrata* male is diagnosed by the palpal tibia (Fig. 197). The lateral apophysis is short and broad, weakly serrated on its margin; no other species in the *tricornis* group has the tibial apophysis of this form.

Distribution.—Known only from the type locality (Map 17).

Natural History.—The type male was adult in September; nothing was recorded on habitat.

Walckenaeria weber, (Chamberlin), new combination
Fig. 210; Map 17

Tigellinus weber Chamberlin 1948:557.

Type.—Female holotype from Smith and Morehouse Canyon, Utah, 7 October 1932 (W. Ivie); in AMNH, examined.

Description.—Only the female is known. Total length: female 2.2-2.4 mm. Carapace: length: female 0.90-0.95 mm. Orange, with dusky markings. Chelicerae: lateral striae fairly widely spaced. Abdomen: black. Sternum: chestnut brown. Legs: orange. TmI: female 0.40-0.45. Epigynum: Fig. 210. The females of *W. occidentalis, W. reclusa, W. septentrionalis, W. columbia* and *W. helenae* have epigyna which are indistinguishable or barely distinguishable from that of *W. weber*, and it cannot be ruled out that one of these species is *W. weber* (*W. helenae* and *W. reclusa* are most likely, from the geographical distributions). In order to establish the true identity of *W. weber* it will be necessary to capture a male and female together at, or very near to, the type locality.

Diagnosis.—Because of the close similarity to the epigynum of *W. weber* to those of the species mentioned above, the diagnosis of *W. weber* must for the present be regarded as very uncertain. Only specimens having the correct form of epigynum (Fig. 210), which were taken at or very near to the type locality, can be regarded as likely to belong to this species..

Distribution.–Known only from the type locality (Map 17).

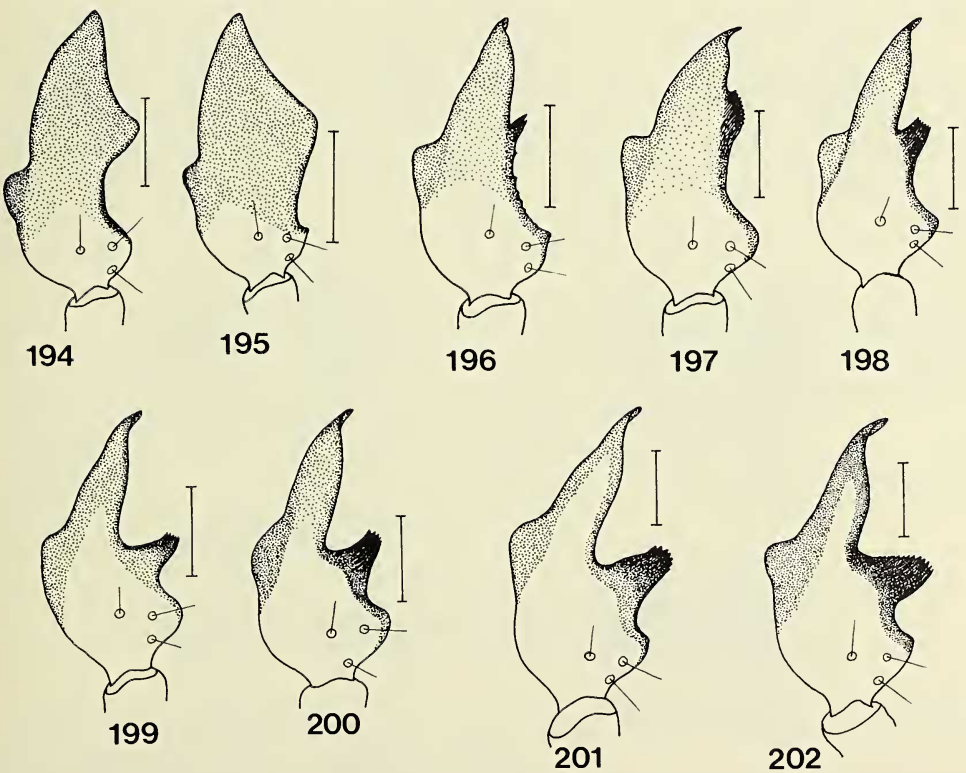
Natural History.–Adult females were taken in June and October; nothing was recorded on habitat.

Walckenaeria occidentalis, new species
Figs. 191, 199, 209; Map 18

Type.–Male holotype from 1.8 miles below Jenks Lake, S. Bernadino Co., California, 23 March 1958 (I. Newell); deposited in AMNH.

Description.–Both sexes were taken together. Total length: female 2.4 mm, male 1.95 mm. Carapace: length: female 0.95 mm, male 0.75 mm. Orange brown, with dusky markings. The lobe (Fig. 191) is constricted in front of the eyes. Chelicerae: the lateral striae of the female are more widely spaced than in *W. weber;* those of the male are moderately closely spaced. Abdomen: black. Sternum: orange, with blackish margins. Legs: orange. TmI: female 0.40-0.42, male 0.43-0.45. Male palp: Fig. 199. Epigynum: Fig. 209.

Diagnosis.–The male of *W. occidentalis* is diagnosed by the palpal tibia (Fig. 199); this is similar to that of *W. reclusa* (Fig. 200), but the angle between the principal and lateral apophyses is wider in *W. occidentalis.* The carapace lobe in *W. occidentalis* is more constricted than in *W. reclusa* (Fig. 191 cf. Flg. 192). The female of *W. occidentalis*



Figs. 194-202.–Male palpal tibiae, dorsal. 194, *W. tricornis*; 195, *W. palustris*; 196, *W. bifida*; 197, *W. serrata*; 198, *W. helenae*; 199, *W. occidentalis*; 200, *W. reculsa*; 201, *W. septentrionalis*; 202, *W. columbia* (Scale lines 0.1 mm).

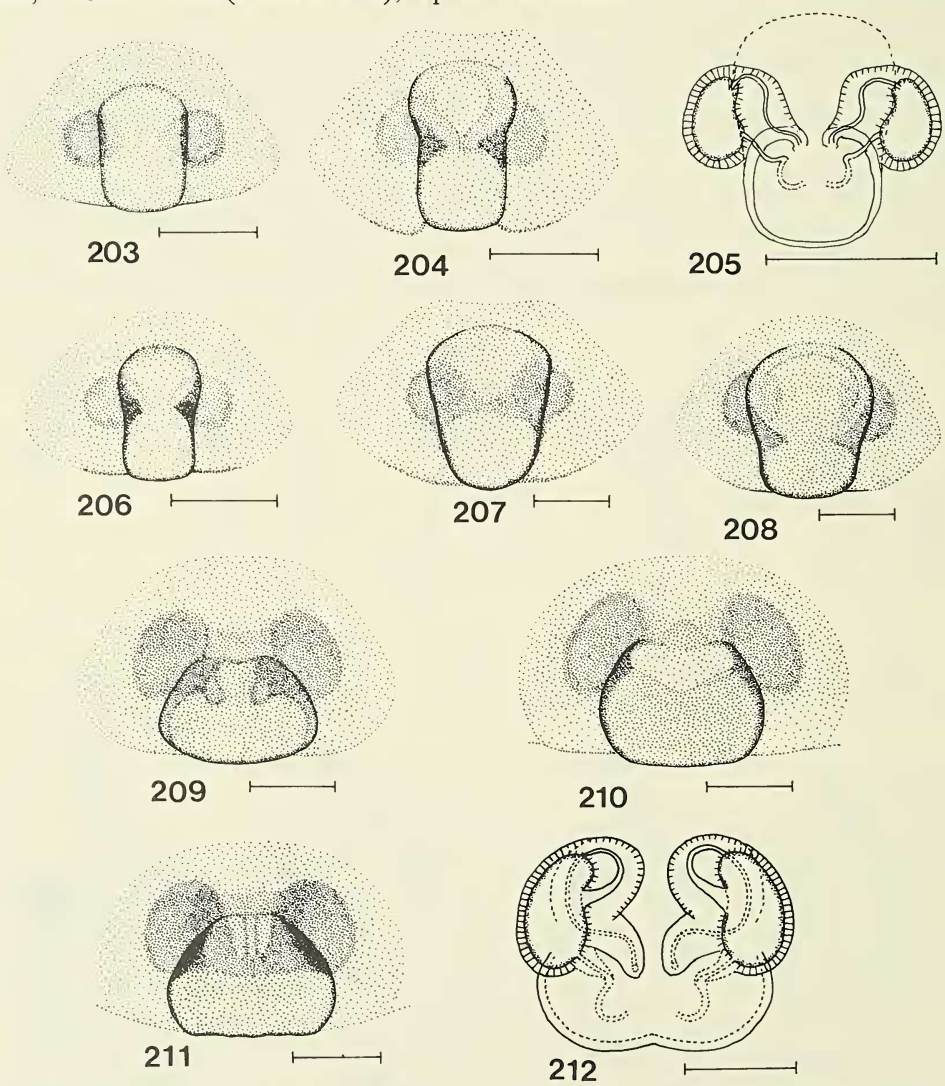
can only be diagnosed by the epigynum (Fig. 209), but it is questionable whether this can be distinguished from those of *W. weber*, *W. helenae*, *W. reclusa*, *W. septentrionalis* and *W. columbia*.

Distribution.—Known only from the type locality (Map 18).

Natural History.—Both sexes were adult in March; nothing was recorded on habitat.

Walckenaeria helenae, new species
Figs. 198, 211; Map 16

Type.—Male holotype from Last Chance Gulch, Helena, Lewis and Clark Co., Montana, 3 October 1964 (J. and W. Ivie); deposited in AMNH.



Figs. 203-212.—Epigyna, ventral. 203, *W. palustris*; 204, *W. aprilis*; 205, *W. palustris*, internal genitalia, cleared; 206, *W. palustris*, Manitoba specimen; 207, *W. solivaga*; 208, *W. anceps*; 209, *W. occidentalis*; 210, *W. weber*; 211, *W. helenae*; 212, *W. columbia*, internal genitalia, cleared (Scale lines 0.1 mm).

Description.–The male and female were taken together. Total length: female 2.2-2.3 mm, male 2.0 mm. Carapace: length: length: female 0.9-1.0 mm, male 0.9 mm. Orange-brown with dusky markings in the female, dark brown in the male. The male lobe is broad and scarcely constricted (as in *W. reclusa*: Fig. 192). Chelicerae: the lateral striae of the female are rather less widely spaced than in *W. weber*; in the male they are moderately spaced. Abdomen: grey to black. Sternum: orange, suffused with black on margins. Legs: orange. TmI: female 0.40-0.47, male 0.41-0.45. Male palp: Fig. 198. Epigynum: Fig. 211.

Diagnosis.–The male of *W. helenae* is diagnosed by the palpal tibia (Fig. 198); this is of the same pattern as those of *W. occidentalis* and *W. reclusa*, but significantly shorter (Fig. 198, cf. Figs. 199, 200). The female epigynum (Fig. 211) is probably indistinguishable from those of *W. weber*, *W. reclusa*, *W. occidentalis*, *W. septentrionalis* and *W. columbia*, and the female cannot therefore be safely diagnosed unless it is taken with a male.

Distribution.–Known only from the type locality (Map 16). This species was taken at the same time and place as *W. solivaga.*

Natural History.–Both sexes were adult in October; nothing was recorded on habitat.

Walckenaeria reclusa, new species
Figs. 187, 192, 200; Map 17

Type.–Male holotype from N.E. of McCall, Valley Co., Idaho, 31 May 1944 (W. Ivie); deposited in AMNH.

Description.–The female described was taken very close to the type locality, but not with a male. Total length: female 2.1 mm, male 1.9-2.0 mm. Carapace: length: female 0.90 mm, male 0.80-0.85 mm. Deep orange. The male lobe is broad and not much constricted (Fig. 192). Chelicerae: the lateral striae are fairly widely spaced in the female, moderately spaced in the male. Abdomen: black. Sternum: orange, with a black margin. Legs: orange. TmI: female/male 0.40-0.45. Male palp: Fig. 200.

Diagnosis.–*W. reclusa* male is diagnosed by the palpal tibia (Fig. 200); the lateral apophysis is very similar to that of *W. occidentalis* (FIg. 199), and for the distinguishing characters, see *W. occidentalis* diagnosis. The female epigynum seems to be indistinguishable from those of *W. weber*, *W. occidentalis*, *W. helenae*, *W. septentrionalis* and *W. columbia*, and the female cannot be diagnosed unless taken with the male.

Distribution.–Known only from the type locality (Map 17).

Natural History.–The female was adult in October, the male in May, August and October; nothing was recorded on habitat.

Walckenaeria septentrionalis, new species
Fig. 201; Map 18

Type.–Male holotype from Sidney, Vancouver Island, British Columbia, 16 September 1935 (Chamberlin and Ivie); deposited in AMNH.

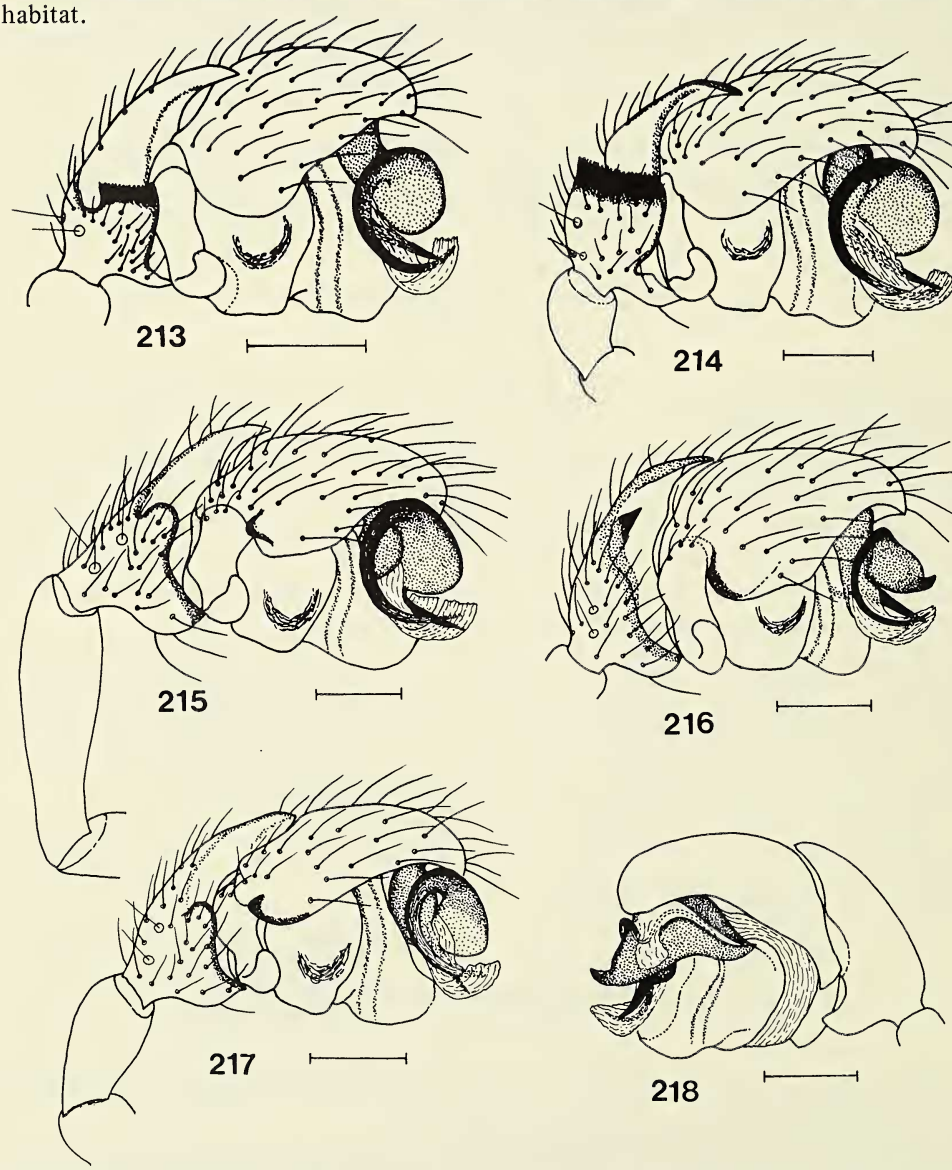
Description.–The male and female were taken together. Total length: female 2.5 mm, male 2.45 mm. Carapace: length: female/male 1.0 mm. Orange, with dusky markings. The male lobe is broad, as in *W. reclusa* (Fig. 192). Chelicerae: the lateral striae are moderately spaced in the female, fairly closely spaced in the male. Abdomen: grey to black.

Sternum: orange, with margins blackish. Legs: orange. TmI: female 0.45-0.47, male 0.40-0.42. Male palp: Fig. 201.

Diagnosis.—*W. septentrionalis* male is diagnosed by the palpal tibia (Fig. 201); the lateral apophysis is of the same form as that present in *W. occidentalis* and *W. reclusa*, but this apophysis, and the whole palp, are significantly larger ((Fig. 201 cf. Figs. 199, 200). The female epigynum seems to be indistinguishable from those of *W. weber, W. occidentalis, W. helenae, W. reclusa* and *W. columbia*, and the female cannot be diagnosed unless taken with the male.

Distribution.—Known only from the type locality (Map 18).

Natural History.—Both sexes were adult in September; nothing was recorded on habitat.



Figs. 213-218.—Male palps. 213, *W. exigua*, ectal; 214, *W. thrinax*, ectal; 215, *W. emarginata*, ectal; 216, *W. pinocchio*, ectal; 217, *W. monoceras*, ectal; 218, *W. pinocchio*, mesal (Scale lines 0.1 mm).

Walckenaeria columbia, new species
Fig. 202, 212; Map 18

Type.–Male holotype from Manning Provincial Park, British Columbia, 20 June-3 July 1979 (C. D. Dondale); deposited in CNC.

Description.–The male and female were taken together. Total length: female 2.65-2.90 mm, male 2.1 mm. Carapace: length: female 0.95-1.0 mm, male 0.90 mm. Orange-brown to dark brown, with dusky markings. The male lobe is broad as in *W. reclusa* (Fig. 192). Chelicerae: the lateral striae are moderately spaced in both sexes. Abdomen: grey to black. Sternum: orange, with dusky markings and margins. Legs: yellow to orange. TmI: female 0.45-0.47, male 0.40-0.50. Male palp: Fig. 202. Epigynum: Fig. 212.

Diagnosis.–*W. columbia* male is diagnosed by the palpal tibia (Fig. 202); the lateral apophysis is similar to that of *W. septentrionalis*, but is shorter and broader and less projecting (Fig. 202 cf. Fig. 201). The female epigynum is indistinguishable from those of *W. weber, W. occidentalis, W. helenae, W. reclusa* and *W. septentrionalis*, and the female cannot be diagnosed unless taken with the male.

Distribution.–Known only from the type locality (Map 18).

Natural History.–Both sexes were taken in June-July, in a pitfall in a rhododendron flat.

minuta Group

The males of this group have very similar palpal organs, and diagnosis is based on the form of the carapace horn, sometimes coupled with the form of the palpal tibia. The females fall into two groups on the basis of two distinct forms of epigynum; within these groups, the epigyna differ sufficiently from one another to make diagnosis relatively easy.

Partial keys to species

Males

1. Ocular area with small protuberance (Fig. 232) . . . . . *cornuella*
   Ocular area with a distinct horn 2

2. Horn short and semi-vertical (Figs. 229, 230, 231) . . . . . .
   . . . . . *minuta, exigua, thrinax* (see species descriptions)
   Horn longer and directed forwards . . . . . .
   . . . . . *monoceras, pinocchio, emarginata* (see species descriptions)

Females

1. Epigyna as Figs. 242, 243, 244, 245 . . . . . .
   . . . . . .*minuta, exigua, tenella, thrinax* (see species descriptions)
   Epigyna as Figs. 246, 247, 248, 249 . . . . . .
   . . . . . .*cornuella, monoceras, placida, emarginata* (see species descriptions)

Walckenaeria minuta (Emerton)
Figs. 219, 221, 229, 233, 242, 250; Map 19

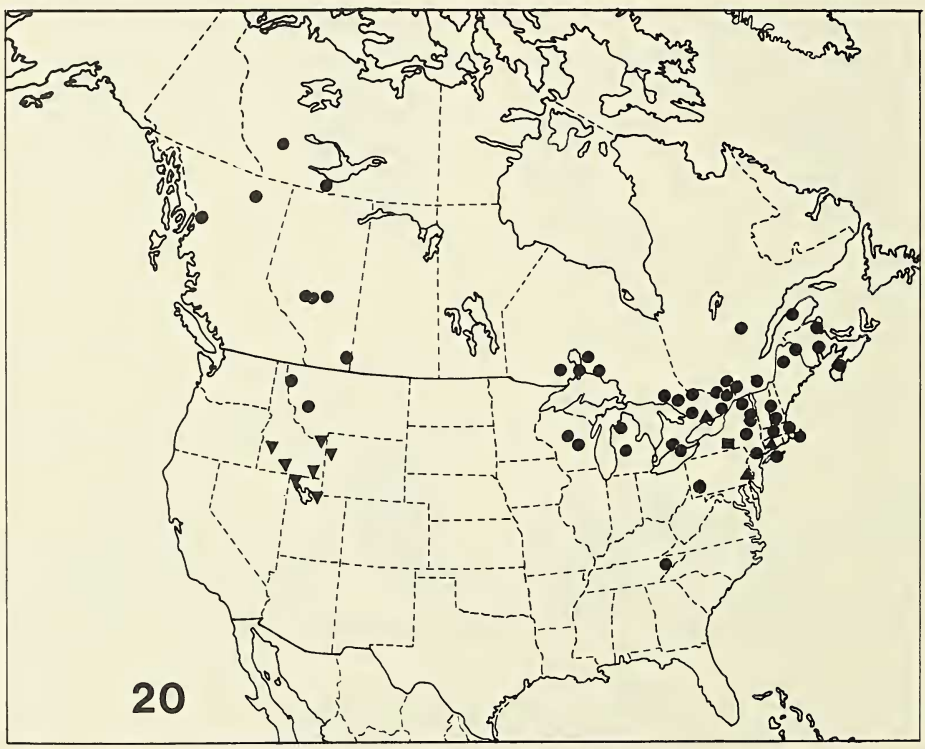
Cornicularia minuta Emerton 1882:42; Crosby and Bishop 1931:371; Roewer 1942:663; Kaston 1948:168; Bonnet 1956:1225.

Walckenaeria (Microcornicularia) minuta: Wunderlich 1972:388.

Type.—Male holotype from Mt. Carmel, Hamden, New Haven Co., Connecticut, 9 October 1881; in Emerton Collection, MCZ, examined.

Description.—Total length: female 1.45-1.60 mm, male 1.4-1.5 mm. Carapace: length: female/male 0.65 mm. Orange to pale brown. The male has a small horn, which is slightly bifid distally (Figs. 229, 233). Chelicerae: the lateral striae are moderately spaced in both sexes. Abdomen: grey to whitish grey. Sternum: yellow, with dusky margins. Legs: orange to orange-brown. TmI: female/male 0.35-0.40. Male palp: Figs. 219, 221. Epigynum: Figs. 242, 250.

Diagnosis.—The male of *W. minuta* is diagnosed by the small horn on the carapace (Figs. 229, 233), coupled with the form of the palpal tibia. Viewed dorsally, the lateral tibial apophysis is narrower in *W. minuta* (Fig. 221) than in the closely related species *W. exigua* (Fig. 222-224) and *W. thrinax* (Fig. 225); viewed laterally, it is narrower, and the fringe of coarse black hairs is more inclined, than in either *W. exigua* or *W. thrinax* (Fig. 219 cf. Figs. 220, 214). The hollow between the lateral and the principal apophyses is wide in *W. minuta*, and decreases in width through *W. exigua* to *W. thrinax*. The carapace horns in *W. minuta* and *W. exigua* are virtually identical, but in *W. thrinax* the horn is somewhat broader (Figs. 231, 234, cf. Figs. 229, 233). The female of *W. minuta* is diagnosed by the epigynum (Fig. 242); the spermathecae and associated structures are seen through the integument to be more upright and less broad than in *W. exigua* (Fig. 243); there is a clear difference in the internal genitalia of these two species (Fig. 250 cf. Fig. 251). *W. minuta* is readily distinguished from *W. tenella* by the epigynum (Fig. 242 cf. Fig. 245), by the wider spacing of the cheliceral striae in *W. minuta*, and by the



Map 20.—North America. Distributions of *W. exigua* (circles), *W. pinocchio* (triangles), *W. thrinax* (inverted triangles) and *W. placida* (square).

stouter legs of *W. tenella* (MT I 1/d and tarsus I 1/d are 3.5-4 in *W. tennella*, 5 in *W. minuta*). *W. minuta* female is distinguished from *W. thrinax* by the epigynum (Fig. 242 cf. Fig. 244), by the significantly larger size of *W. thrinax* and probably also by the geographical distributions.

Distribution.–This species has been taken in the eastern and central parts of the U.S.A. (Map 19); the record shown for New Mexico is based on a female which shows small differences from the eastern populations and may prove to be another species. There are no records for Canada.

Natural History.–Adult females have been taken in April, May October and November, males in January, March-May and September-November. Nothing was recorded on habitat.

Walckenaeria exigua, new species
Figs. 213, 220, 222, 223, 224, 230, 243, 251; Map 20)

Type.–Male holotype from Island 1024, Lake Temagami, Ontario, 15-25 August 1946 (Gertsch, Ivie and Kurata); deposited in AMNH.

Description.–The two sexes have been taken together on many occasions. Total length: female 1.55-1.75 mm, male 1.35-1.75 mm. Carapace: length: female 0.65-0.75 mm, male 0.65-0.70 mm. Orange-brown to chestnut brown, often slightly darkened anteriorly. The male has a small horn (Fig. 230), similar to that of *W. minuta*. Chelicerae: the lateral striae are moderately spaced in the female, more closely spaced in the male, Abdomen: grey to black. Sternum: orange to brown, with margins suffused with black. Legs: yellow to orange-brown. TmI: female 0.40-0.45, male 0.36-0.42. Male palp: Figs. 213, 220, 222, 223, 224. Epigynum: Figs. 243, 251; there are small variations in the position and shape of the spermathecae.

Diagnosis.–This species has been confused in the past, even by Emerton himself, with *W. minuta*, and many of the specimens labelled *"W. minuta"* in the museum collections are *W. exigua*. The separation of *W. exigua* male from *W. minuta* is dealt with under *W. minuta* diagnosis. *W. exigua* male is distinguished from *W. thrinax* by the form of the palpal tibia, the lateral apophysis being narrower, and the hollow between the lateral and the principal apophyses wider, in *W. exigua* than in *W. thrinax* (Figs. 222-224 cf. Fig. 225); *W. thrinax* is also significantly larger in size. *W. exigua* female is diagnosed by the epigynum (Fig. 243); there is no problem in distinguishing the epigyna of *W. minuta* (Fig. 242; see *W. minuta* diagnosis) or of *W. tenella* (Fig. 245). The epigynum of *W. thrinax* (Fig. 244) is quite similar to that of *W. exigua*, but distinguishable, if only by its size: the width of the posterior plate in *W. exigua* is 0.110-0.125 mm, in *W. thrinax* 0.155-0.165 mm. *W. thrinax* is also significantly larger in size than *W. exigua*, and the leg proportions are different: e.g., MTI/tI is 1.25-1.3 for *W. thrinax* female, and 1.1 for *W. exigua* female.

Distribution.–*W. exigua* is distributed widely over the northern part of the continent (Map 20).

Natural History.–Adult females have been taken in all months except January, March and December, males in all months except March, November and December. Habitats recorded are in sphagnum, on dunes, in fields or grass, in leaf litter and in woods.

Walckenaeria tenella, new species
Fig. 245; Map 19

Type.—Female holotype from Janis Point, Ulster Co., New York, 24 May 1920 (S. C. Bishop); deposited in AMNH.

Description.—Only the female is known. Total length: female 1.60 mm. Carapace: length: female 0.62 mm. Orange, with faint dusky markings. Chelicerae: lateral striae closely spaced. Abdomen: grey-black. Sternum: orange-yellow. Legs: orange-yellow; short and stout, with MTI 1/d and tarsus I 1/d 3.5-4. TmI: female 0.41-0.45. Epigynum: Fig. 245.

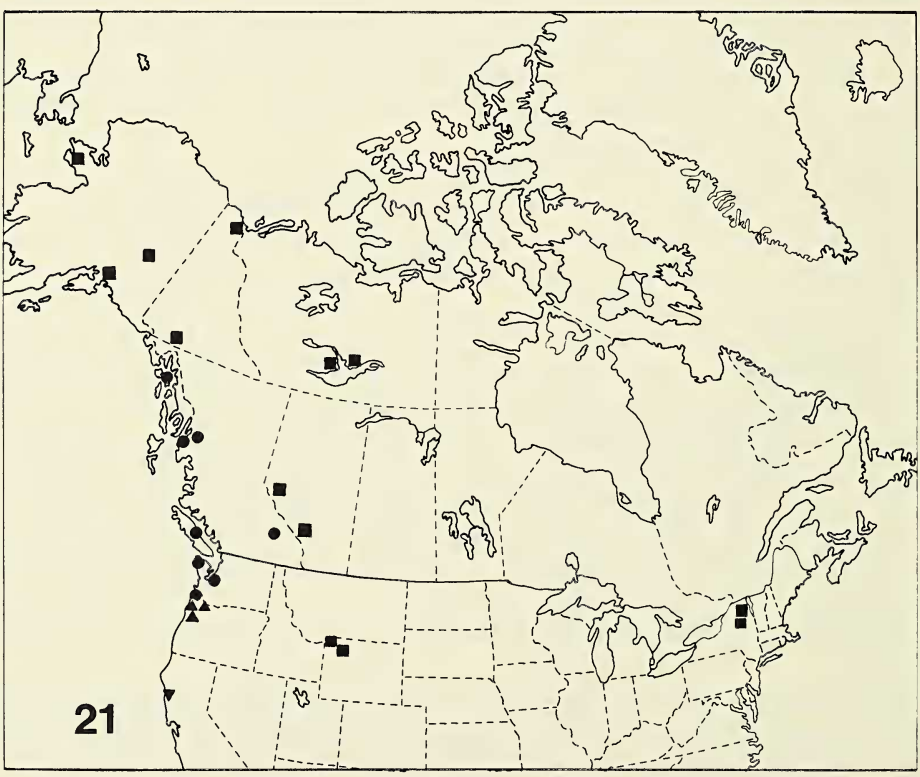
Diagnosis.—*W. tenella* female is diagnosed by the epigynum (Fig. 245), the closely spaced cheliceral striae, and the stout legs (see *W. minuta* diagnosis).

Distribution.—Known only from two localities in the northeast (Map 19).

Natural History.—Adult females have been taken in May and August; nothing was recorded on habitat.

Walckenaeria thrinax (Chamberlin and Ivie)
Figs. 214, 225, 231, 234, 244; Map 20

Cornicularia thrinax Chamberlin and Ivie 1933:24; Roewer 1942:664; Bonnet 1956:1225.
Walckenaeria (Pseudocornicularia) thrinax: Wunderlich 1972:388.

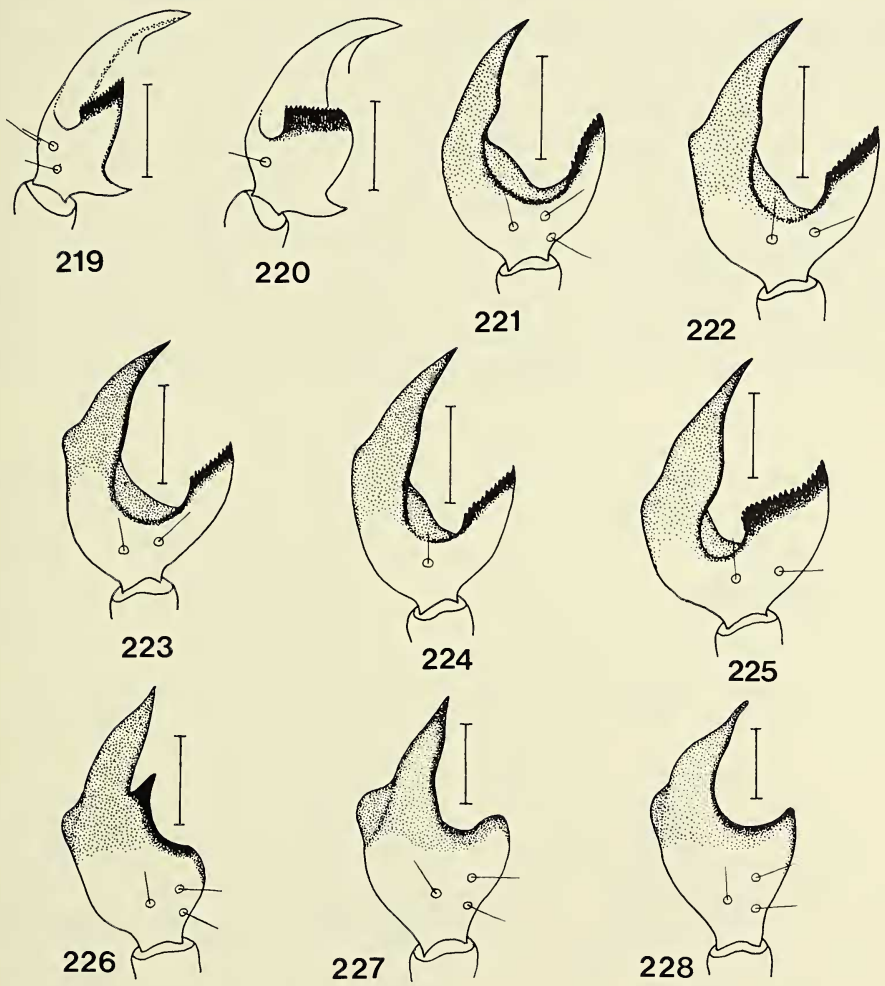


Map 21.—North America. Distributions. of *W. cornuella* (circles), *W. monoceras* (triangles), *W. emarginata* (inverted triangle) and *W. holmi* (squares).

Type.–Male holotype from Dove Creek, Raft River Mtns., Boxelder Co., Utah, 9 September 1936 (Chamberlin and Ivie); in AMNH, examined.

Description.–Total length: female 1.9-2.1 mm, male 1.9-2.0 mm. Carapace: length: female 0.80-0.90 mm, male 0.80-0.85 mm. Orange to orange brown, with dusky markings. The male has a short, broad horn (Figs. 231, 234). Chelicerae: the lateral striae are moderately spaced in both sexes. Abdomen: grey to black. Sternum: orange, with blackish margins. Legs: orange-yellow. TmI: female/male 0.40-0.42. Male palp: Figs. 214, 225. Epigynum Figs. 244; the shape of the spermathecae and of the posterior area show some variations.

Diagnosis.–*W. thrinax* male is diagnosed by the male carapace horn (Figs. 231, 234) and by the form of the palpal tibia (Figs. 214, 225); see *W. minuta* diagnosis. *W. thrinax* female is diagnosed by the epigynum (Fig. 244), which though rather similar to that of *W. exigua* (Fig. 243) is distinguishable (see *W. exigua* diagnosis).



Figs. 219-228.–Male palpal tibiae. 219, *W. minuta*, ectal; 220, *W. exigua*, ectal; 221, *W. minuta*, dorsal; 222, *W. exigua*, type, dorsal; 223, *W. exigua*, New Brunswick specimen, dorsal; 224, *W. exigua*, British Columbia specimen, dorsal; 225, *W. thrinax*, dorsal; 226, *W. pinocchio*, dorsal; 227, *W. cornuella*, dorsal; 228, *W. emarginata*, dorsal (Scale lines 0.1 mm).

Distribution.—Recorded only from a limited area in Utah, Wyoming and Idaho (Map 20).

Natural History.—Adult females have been taken in June-September, males in August. Nothing was recorded on habitat.

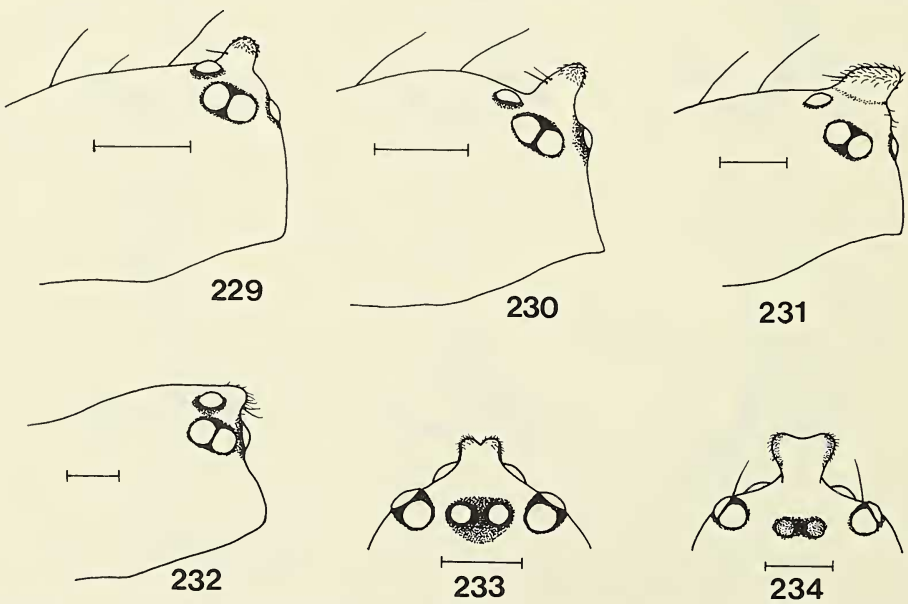
Walckenaeria cornuella (Chamberlin and Ivie), new combination
Figs. 227, 232, 246; Map 21

Sisicottus cornuella Chamberlin and Ivie 1939:65; Bonnet 1958:4065.
Sisicottus cornuellus: Roewer 1942:650.

Type.—Male holotype from Jack Horner Creek, near Nehalem, Tillamook Co., Oregon, 25 August 1936 (W. Ivie); in AMNH, examined.

Description.—Total length: female 2.45 mm, male 2.1-2.2 mm. Carapace: length: female 1.10 mm, male 0.95-1.05 mm. Orange to deep orange, with faint dusky markings. The male has a small projection or "horn" in the ocular area (Fig. 232). Chelicerae: the lateral striae are moderately spaced in both sexes. Abdomen: grey-black. Sternum: orange, with dusky margins. Legs: yellow to orange. TmI: female 0.40, male 0.35-0.38. Male palp: Fig. 227; the palpal organs, apart from being somewhat larger in size, are indistinguishable from those of *W. monoceras* (Fig. 217). Epigynum: Fig. 246.

Diagnosis.—*W. cornuella* is diagnosed by the small projection arising from the ocular area (Fig. 232), and confirmed by the form of the palpal tibia (Fig. 227). The female is diagnosed by the epigynum (Fig. 246), which seems to be distinguishable from that of *W. monoceras* (Fig. 248) by the somewhat shorter convergent lines enclosing the posterior area and by the less elongated spermathecae. *W. cornuella* female is normally larger in size than *W. monoceras*, and the legs are marginally slimmer (tibia I 1/d 5 for *W. cornuella*, 4



Figs. 229-234.—Male carapaces. 229.*W. minuta*, lateral; 230, *W. exigua*, lateral; 231, *W. thrinax*, lateral; 232, *W. cornuella*, lateral; 233, *W. minuta*, in front; 234, *W. thrinax*, in front (Scale lines 0.1 mm).

for *W. monoceras*). The epigyna of *W. cornuella* and *W. emarginata* (Fig. 249) seem to be distinguishable, and the anterior elevation of the carapace in *W. emarginata* will confirm the separation.

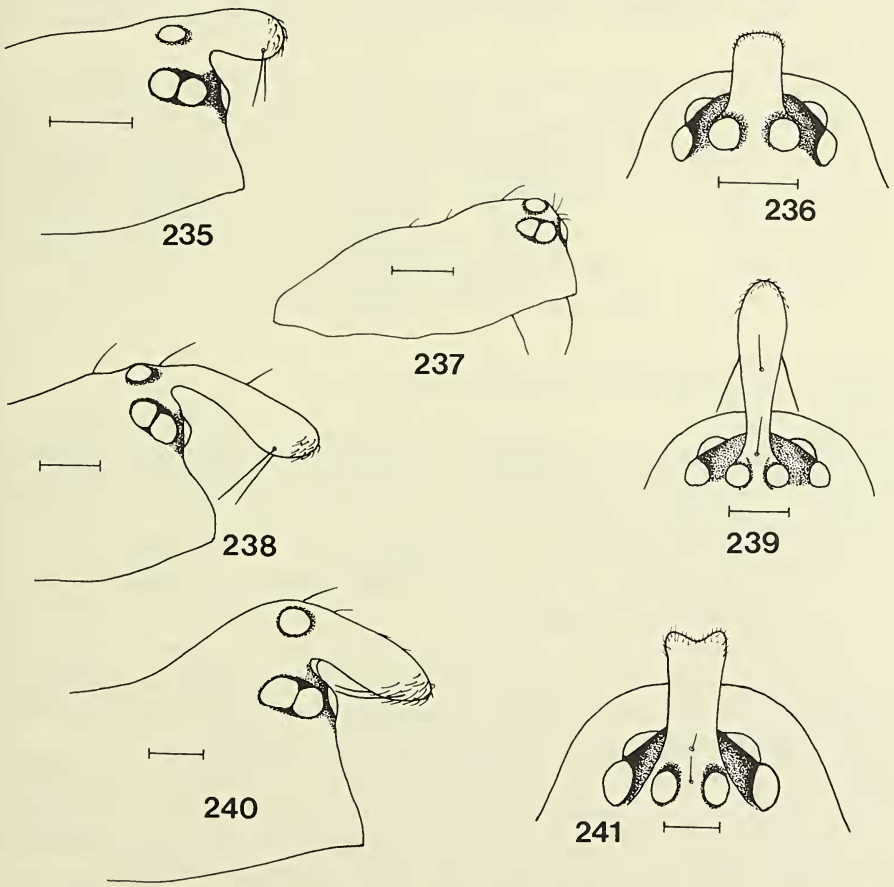
Distribution.–Recorded only from the northwestern coastal area of N. America (Map 21).

Natural History.–Adult females have been taken in June-September, males in May-July. The only habitat recorded was in woods.

Walckenaeria monoceras (Chamberlin and Ivie)
Figs. 217, 235, 236, 248, 252; Map 21

Cornicularia monoceras Chamberlin and Ivie 1947:33.
Walckenaeria (Kastonia) monoceras: Wunderlich 1972:389.

This species should not be confused with the European species *W. (Prosopotheca) monoceros* (Wider).



Figs. 235-241.–Carapaces. 235, *W. monoceras*, male, lateral; 236, *W. monoceras*, male, dorsal; 237, *W. emarginata*, female, lateral; 238, *W. pinocchio*, male lateral; 239, *W. pinocchio*, male, dorsal; 240, *W. emarginata*, male, lateral; 241, *W. emarginata*, male dorsal (Scale lines 0.1 mm).

Type.—No types seem to have been designated. One vial of *Cornicularia monoceras* (2 males, one female) in AMNH has a pencilled label of the locality which agrees with the type locality given by Chamberlin and Ivie (1947), namely, N. of Monroe, Benton Co., Oregon, 3 March 1937 (J. C. Chamberlin). One male has been selected from this vial and labelled "Lectotype"; this is deposited in AMNH.

Description.—Total length: female 2.0-2.2 mm, male 1.85-2.0 mm. Carapace: length: female/male 0.82-0.90 mm. Orange to orange-brown, with dusky markings. The male has a rather bulbous horn arising from the ocular area (Figs. 235, 236); the distal end of the horn bears short hairs, and two long bristles project downwards from near the distal end. Chelicerae: the lateral striae are fairly closely spaced in both sexes. Abdomen: grey to black. Sternum: orange, with dusky margins. Legs: orange. TmI: female 0.37, male 0.35. Male palp: Fig. 217. Epigynum: Figs. 248, 252.

Diagnosis.—The male of *W. monoceras* is diagnosed by the form of the horn (Figs. 235, 236), which distinguishes this species from all others; confirmation is given by the form of the male palp (Fig. 217). The carapace horns of *W. pinocchio* and *W. emarginata* are generally similar, but longer. *W. monoceras* female is diagnosed by the epigynum (Fig. 248), which is probably distinguishable from those of *W. cornuella* (see *W. cornuella* diagnosis) and *W. emarginata* (Fig. 249); the anterior elevation of the carapace in *W. emarginata* (Fig. 237), which is absent in *W. monoceras*, will confirm the separation of these two species.

Distribution.—Known only from the western coastal area of Oregon (Map 21).

Natural History.—Adult females have been taken in March, November and December, males in February, March, April, November and December. Habitats recorded are in moss near a stream, and in douglas fir litter.

Walckenaeria pinocchio (Kaston)
Figs. 216, 218, 226, 238, 239; Map 20

Cornicularia pinocchio Kaston 1945:7; and 1948:168.
Walckenaeria (Kastonia) pinocchio: Wunderlich 1972:389.

Type.—Male holotype from Mt. Carmel, New Haven Co., Connecticut, 19 April 1935 (B. J. Kaston); in AMNH, examined. This type is in bad condition, with one palp, all the legs and the carapace horn missing.

Description.—Only the male is known (but see *W. placida*). Total length: male 1.8-2.0 mm (excl. horn). Carapace: length: male 0.70-0.90 (excl. horn). Brown, with dusky markings. There is a long horn projecting from the ocular area (Figs. 238-239); the distal end of this horn bears short hairs, and two long bristles project towards the clypeus from near the distal end. Chelicerae: the lateral striae are fairly closely spaced. Abdomen: grey. Sternum: orange, with dusky markings. Legs: yellow-brown. TmI: male 0.40. Male palp: Figs. 216, 218, 226; the anterior end of the ED has a sharp point.

Diagnosis.—*W. pinocchio* male is diagnosed by the very distinctive horn (Figs. 238, 239), and diagnosis is confirmed b the form of the palpal tibia (FIg. 226) and by the pointed anterior end of the ED (fig. 218). *W. emarginata* has the carapace horn of rather similar length, but this horn is stouter and bifid at the tip (Figs. 240, 241).

Distribution.—The only three records are from the northeastern part of the continent (Map 20).

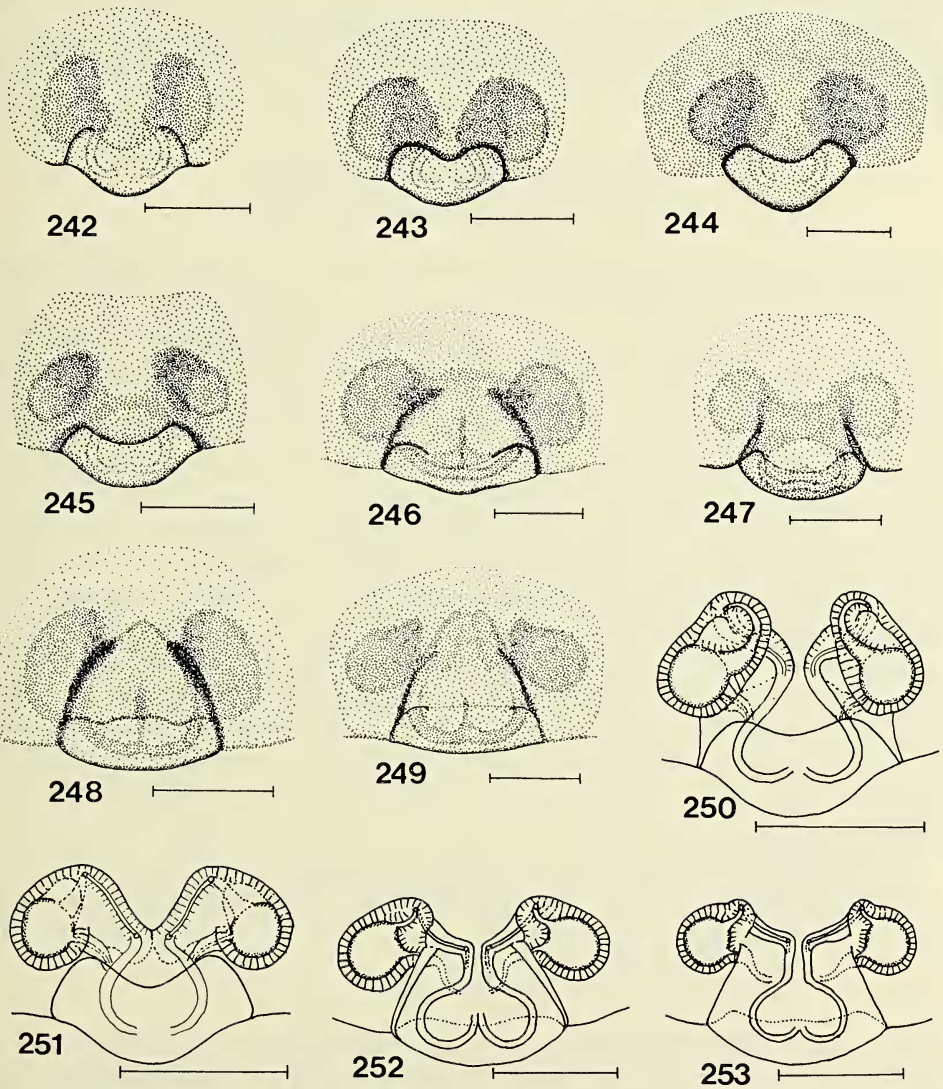
Natural History.—Adult males were taken in May and October; nothing was recorded on habitat.

Walckenaeria placida (Banks)
Figs. 247, 253; Map 20

Cornicularia placida Banks 1892:35, and 1916:72; Crosby and Bishop 1931:373; Roewer 1942:664; Bonnet 1956:1225.
Walckenaeria (Cornicularia) placida: Wunderlich 1972:385.

Type.–Female holotype from Fall Creek, Ithaca, Tompkins Co., New York; in MCZ, examined. This type is very faded in color, and most of the legs are missing.

Description.–Only the female is known. Total length: female 2.0 mm. Carapace: length: female 0.90 mm. Orange. Chelicerae: lateral striae fairly widely separated. Abdomen: whitish grey. Sternum: yellow, darker on margins. Legs: pale yellow. Epigynum:



Figs. 242-253.–Epigyna, ventral. 242. *W. minuta*; 243, *W. exigua*; 244, *W. thrinax*; 245, *W. tenella*; 246, *W. cornuella*; 247, *W. placida*; 248, *W. monoceras*; 249, *W. emarginata*; 250, *W. minuta*, internal genitalia, cleared; 251, *W. exigua*, internal genitalia, cleared; 252, *W. monoceras*, internal genitalia, cleared; 253, *W. placida*, internal genitalia, cleared (Scale lines 0.1 mm).

Figs. 247, 253; in fresh specimens the integument of the epigynum would be more deeply pigmented and less transparent. It is possible that *W. placida* is the female of *W. pinocchio* (the name *placida* would have priority). The epigynum (external and internal) is of the form to be expected, being generally similar to those of *W. cornuella* and *W. monoceras*, and the localities of capture of *W. placida* and *W. pinocchio* are in the same geographical area (Map 18). This matter cannot be resolved until both sexes of *W. pinocchio* are taken together, and the female compared with *W. placida.*

Diagnosis.—The female of *W. placida* must be diagnosed by the epigynum (Figs. 247, 253); the unique specimen is however rather bleached, and fresh specimens would no doubt have a somewhat different appearance, being perhaps more similar to *W. cornuella* (Fig. 246). Until further specimens become available, the diagnosis must remain somewhat uncertain.

Distribution.—Known only from the type locality (Map 20).

Natural History.—The type female was taken in October; nothing was recorded on habitat.

Walckenaeria emarginata, new species
Figs. 215, 228, 237, 240, 241, 249; Map 21

Type.—Male holotype from Mendocino, Mendocino Co., California, 1 January 1958 (J. R. Helfer); deposited in AMNH.

Description.—The female described came from the type locality, but on a different date. Total length: female 2.3 mm, male 2.25 mm (excl. horn). Carapace: length: female 1.1 mm, male 1.0 mm (excl. horn). Orange-brown. The female carapace is raised anteriorly (Fig. 237). The male horn is stout, slightly notched distally, and slopes downwards (Figs. 240, 241); distally it bears short hairs, and from near the distal end two long bristles project backwards to the anterior median eyes. Chelicerae: the lateral striae are fairly closely spaced in the female, more widely separated in the male. Abdomen: grey to black. Sternum: orange. Legs: orange. TmI: female 0.45, male 0.40-0.45. Male palp: Fig. 215; the patella is long, and the tibia and palpal organs are of the same form is in *W. monoceras.* Epigynum: Fig. 249.

Diagnosis.—The male of *W. emarginata* is diagnosed by the distinctive carapace horn (Figs. 240, 241), which is notched at the tip. The palp is very similar to that of *W. monoceras*, but the patella is longer (Fig. 215 cf. Fig. 217). The female can be diagnosed by the epigynum (Fig. 249), which differs slightly from those of *W. cornuella* (Fig. 246) and *W. monoceras* (Fig. 248), coupled with the carapace profile (Fig. 237) and possibly the geographical distribution.

Distribution.—Known only from the type locality (Map 21).

Natural History.—The male was adult in June; nothing was recorded on habitat.

unicornis Group

This group contains five species in N. America. The males are readily diagnosed by the form of the palpal tibiae; the females can be diagnosed by the epigynum, although it is not always easy to separate *W. clavicornis* and *W. holmi.*

Partial keys to species

Males

1. Palpal tibial apophyses intersecting (Figs. 262, 263) . . . . . *clavicornis, holmi* (see species descriptions)
   Palpal tibial apophyses not intersecting . . . . . *auranticeps, lepida* (see species descriptions)

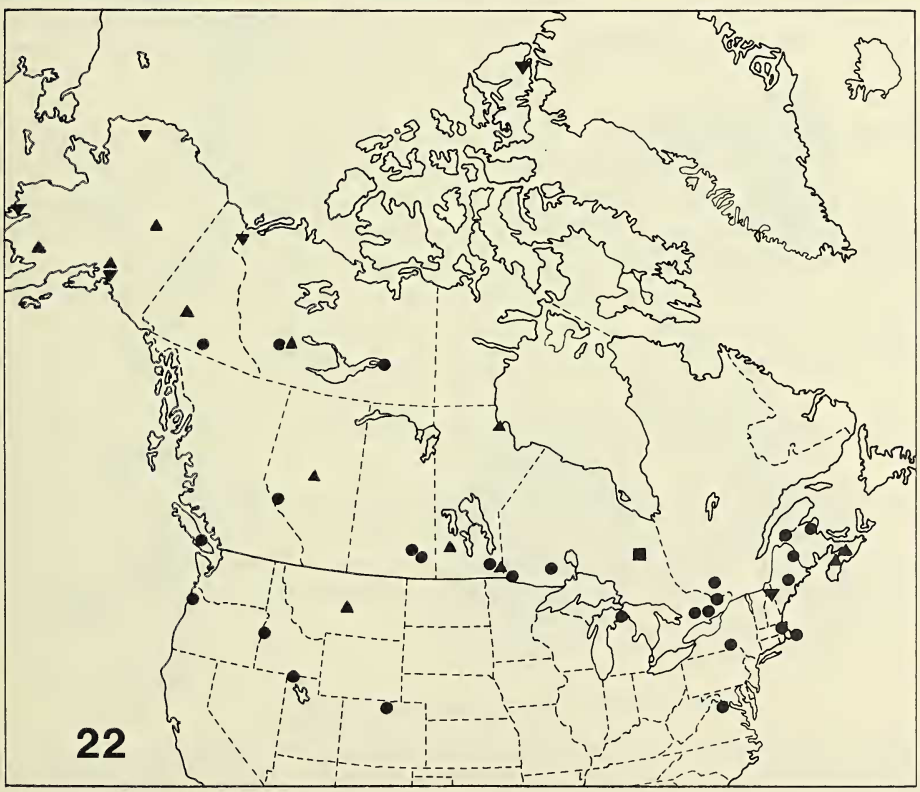
Females

1. Epigynum with two tongue-like projections (Figs. 279-284) . . . . . *clavicornis, holmi* (see species descriptions)
   Epigynum not of this form 2

2. Posterior area of epigynum enclosed by convex lines (Figs. 274, 276) . . . . . *auranticeps, fusciceps* (see species descriptions)
   Posterior area of epigynum enclosed by concave lines (Fig. 275). . . . . *lepida*

Walckenaeria auranticeps (Emerton)
Figs. 254, 255, 257, 267, 268, 273, 276; Map 22

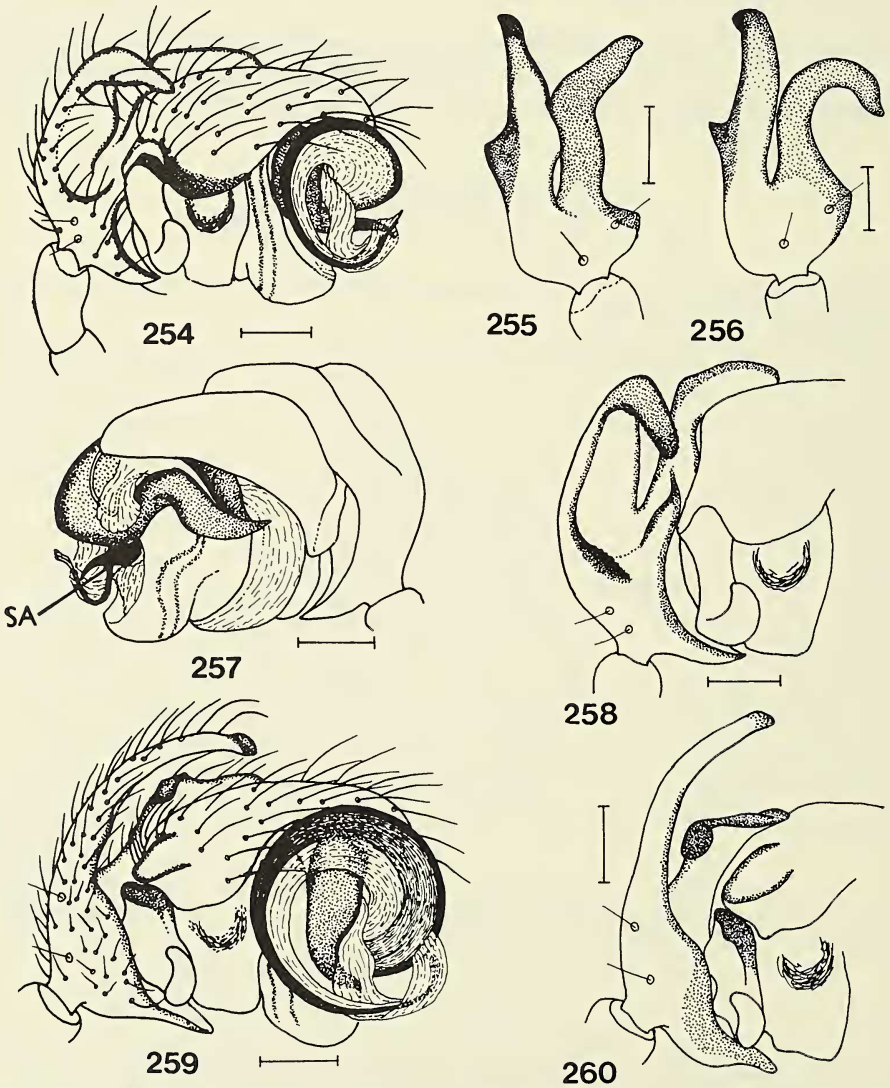
Cornicularia auranticeps Emerton 1882:43; Crosby and Bishop 1931:361; Roewer 1942:662; Kaston 1948:168; Bonnet 1956:1220.
Walckenaeria (Cornicularia) auranticeps: Wunderlich 1972:383.



Map 22.–North America. Distributions of *W. auranticeps* (circles), *W. lepida* (triangles), *W. clavicornis* (inverted triangles) and *W. fusciceps* (square).

Type.—Male and female syntypes from Clarendon Hills, Hyde Park, Suffolk Co., Massachusetts, 24 March 1975; in Emerton Collection, MCZ, examined.

Description.—Total length: female 2.25-3.20 mm, male 2.0-2.2 mm. Carapace: length: female 1.0-1.2 mm, male 0.9-1.0 mm. Bright orange. The male has a broad, upright horn in the ocular area (Figs. 267, 268). Chelicerae: the lateral striae are closely spaced in both sexes. Abdomen: black. Sternum: orange, with dusky margins; a few minute pits are present. Legs: femora orange, remaining segments dark blackish brown. TmI: female/male 0.50-0.55. Male palp: Figs. 254, 255, 257. Epigynum: Figs. 273, 276; the shape of the posterior area is variable, but the margins are always convex. *W. auranticeps* is close to the European species *W. unicornis* (O. P.-Cambridge), but the color is different and there are small differences in the genitalia.



Figs. 254-260.—254, *W. auranticeps*, male palp, ectal; 255, *W. auranticeps*, male palpal tibia, dorsal; 256, *W. lepida*, male palpal tibia, dorsal; 257, *W. auranticeps*, male palp, mesal; 258, *W. lepida*, male palpal tibia, ectal; 259, *W. clavicornis*, male palp, ectal; 260, *W. holmi*, male palpal tibia, ectal. Abbreviation: SA, suprategular apophysis (Scale lines 0.1 mm).

Diagnosis.–The male of *W. auranticeps* is diagnosed by the horn on the carapace (Fig. 267), coupled with the form of the palpal tibia and of the palp (Figs. 254, 255). The closely related species *W. lepida* is distinguished from *W. auranticeps* by the form of the palpal tibia, in which the lateral apophysis curves outwards and downwards (Figs. 256, 258). The female of *W. auranticeps* is diagnosed by the epigynum (Fig. 273). The epigynum of *W. fusciceps* is similar, but has the central area broader, and the spermathecae are near to the posterior margin (Fig. 276); *W. fusciceps* is also different in color. In *W. lepida*, which has a similar color to that of *W. auranticeps*, the central area of the epigynum has concave margins as opposed to the convex margins of *W. auranticeps* (Fig. 274 cf. Fig. 273).

Distribution.–*W. auranticeps* is widely distributed over the central and northern parts of the continent (Map 22). It has on occasions been taken in the same area as *W. lepida.*

Natural History.–Adult females have been taken in March and May-October, males in March, May, June and August-November. Habitats are under leaves, in grass, and on low vegetation (by sweeping or beating).

Walckenaeria lepida (Kulczynski)
Figs. 256, 258, 274; Map 22

Cornicularia lepida Kulczynski 1885:39; Roewer 1942:661.
Walckenaera lepida; Bonnet 1959:4813.
Walckenearia (Cornicularia) lepida: Wunderlich 1972:385.
Cornicularia pacifica Emerton 1923:242; Roewer 1942:663; Bonnet 1956:1225. I have confirmed this synonymy (Ivie 1967:127) by examination of Emerton's male type (MCZ).

Type.–The male holotype (Kamchatka, Siberia) is presumably in the Kulcznski Collection in Warsaw, but I have been unable to obtain it for examination.

Description.–The female, which has been taken with the male, is described for the first time. Total length: female 2.55 mm, male 2.0-2.45 mm. Carapace: length: female 1.0 mm, male 0.95-1.0 mm. Bright orange. The male has a horn in the ocular area, similar to that of *W. auranticeps.* Chelicerae: the lateral striae are fairly widely spaced in the female, but closely spaced in the male. Abdomen: black. Sternum: orange, with dusky margins. Legs: the femora are orange, the remaining segments brown. TmI: female/male 0.50-0.55. Male palp: Figs. 256, 258. Epigynum: Fig. 274.

Diagnosis.–This species is very similar to *W. auranticeps*, and its diagnosis is dealt with under that species.

Distribution.–*W. lepida* is distributed across the northern part of the continent, most of the records being from Canada (Map 22). The type locality is in eastern Asia.

Natural History.–Adult females have been recorded in April-July and in September, males in May, June and August. It has been taken on low vegetation and at ground level in traps.

Walckenaeria fusciceps, new species
Fig. 275; Map 22

Type.–Female holotype from Gregoire Mills, Ontario, 22 June-11 July 1973 (Redner and Starr); deposited in CNC.

Description.—Only the female is known. Total length: female 3.3 mm. Carapace: length: female 1.40 mm. Deep chestnut brown. Chelicerae: the lateral striae are widely spaced. Abdomen: grey-black. Sternum: deep chestnut brown, with blackish margins; the surface has numerous minute pits. Legs: orange. TmI: female 0.70. Epigynum: Fig. 275.

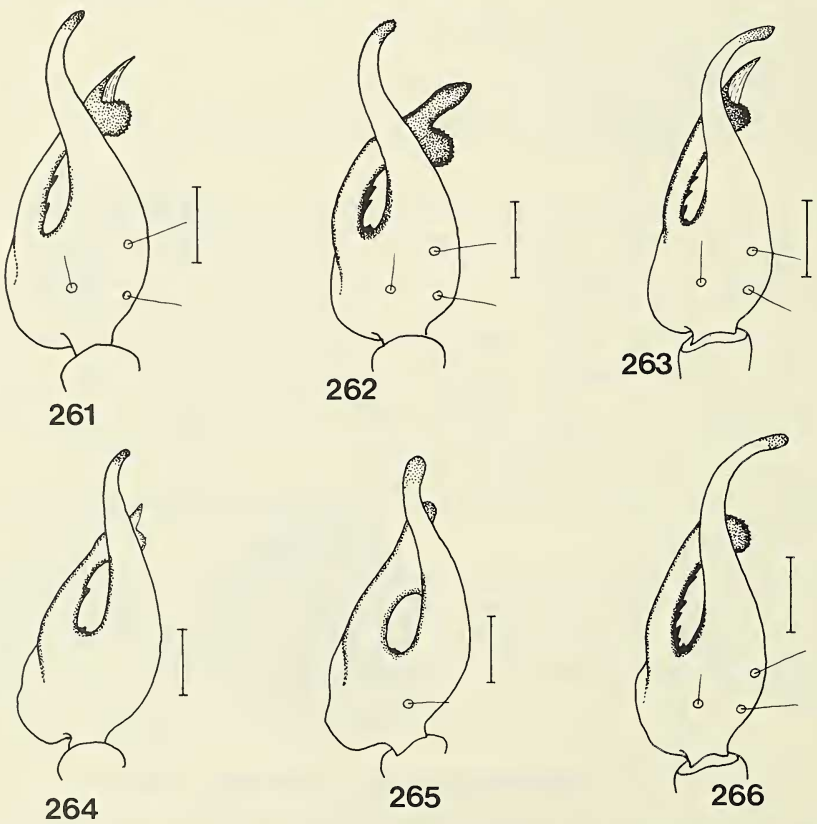
Diagnosis.—*W. fusciceps* female is diagnosed by the epigynum (Fig. 275) and the color (see *W. auranticeps* diagnosis); confirmation is offered by the high value of TmI (0.70).

Distribution.—Known only from the type locality (Map 22).

Natural History.—The type female was taken adult in June-July, in a pitfall in tall grass.

Walckenaeria clavicornis (Emerton)
Figs. 5, 6, 259, 263, 266, 269, 270, 271, 272, 279, 281, 283; Map 22

Cornicularia clavicornis Emerton 1882:43; Holm 1967:24.
Cornicularia karpinskii: Braendegaard 1946:35; Locket and Millidge 1953:207 (misidentification) (*nec C. karpinskii* O.P.-Cambridge).
Walckenaeria (Cornicularia) clavicornis: Wunderlich 1972:383.
not Cornicularia clavicornis: Crosby and Bishop 1931: Figs. 18-23.

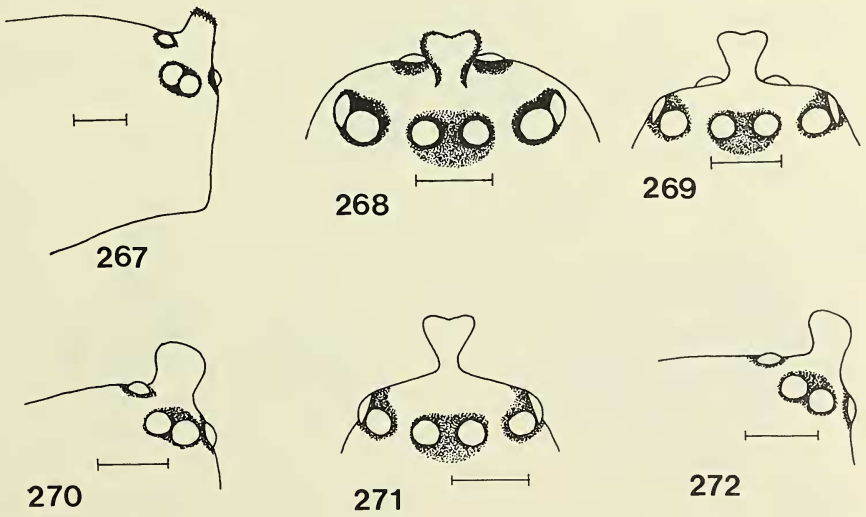


Figs. 261-266.—Male palpal tibiae. 261, *W. karpinskii*, type, dorsal; 262, *W. holmi*, dorsal; 263, *W. clavicornis*, dorsal; 264, *W. karpinskii*, type meso-dorsal; 265, *W. holmi*, meso-dorsal; 266, *W. clavicornis*, another specimen, dorsal (Scale lines 0.1 mm).

Type.–Holotype male from Mt. Washington, Coos Co., New Hampshire, 11 June 1877; in MCZ, examined.

Description.–Total length: female 2.0-2.5 mm, male 2.0-2.3 mm. Carapace: length: female 0.9-1.0, male 0.90-0.95. Orange-brown to deep brown, with dusky markings. The male has a stout horn in the ocular area (Figs. 269-272) Chelicerae: the lateral striae are moderately spaced in both sexes. Abdomen: grey to black. Sternum: orange-brown, with dark margins. Legs: brown to orange-brown. TmI: female 0.50-0.54, male 0.47-0.50. Male palp: Figs. 259, 263, 266. Epigynum: Figs. 279, 281, 283; the entrances to the spermathecal ducts seem to lie beneath the plates (cf. Fig. 277).

Diagnosis.–The male is diagnosed by the form of the palp (Fig. 259) and the tibial apophyses (Figs. 263, 266). *W. clavicornis* is closely similar to *W. holmi*; the males are distinguished by the palpal tibiae. In *W. holmi* (Fig. 262) the mesal apophysis crosses the lateral apophysis to a greater extent than in *W. clavicornis*, and the distal end of the mesal apophysis is much stouter and blunter in *W. holmi* than in *W. clavicornis*. The female of *W. clavicornis* is diagnosed by the epigynum (Figs. 279, 281, 283), which has two tongue-like plates projecting posteriorly. *W. holmi* has a very similar epigynum, and in some cases it can be difficult to distinguish the females of these two species. Where the epigynal plates of *W. clavicornis* are "typical" in shape, with a distinct lateral bulge (Figs. 279, 281), separation from *W. holmi* (Figs. 278, 280, 282) is simple. Unfortunately, some females of *W. clavicornis* (taken with authentic males) have the plates very similar in shape to those of some specimens of *W. holmi* (Fig. 283 cf. Fig. 278); where this is the case, recourse must be made to the length of the plates, which in *W. clavicornis* are usually up to 0.15 mm, while in *W. holmi* they are ca. 0.18 mm and upwards (Holm 1967). Females of *W. holmi* seem always to have a plate length of at least 0.18 mm, but in some specimens of *W. clavicornis* the plate length exceeds 0.15 mm; in instances of this kind, the two species can probably be distinguished by the fact that in *W. holmi* the plates extend anteriorly beyond the spermathecae, which is not the case with *W. clavicornis* (e.g. Fig. 278 cf. Fig. 283).



Figs. 267-272.–Male carapaces. 267, *W. auranticeps*, lateral; 268, *W. auranticeps*, in front; 269, *W. clavicornis*, type, in front; 270, *W. clavicornis*, type, lateral; 271, *W. clavicornis*, Hazen Camp specimen, in front; 272, *W. clavicornis*, Hazen Camp specimen, lateral (Scale lines 0.1 mm).

Distribution.—In N. America, this holarctic species is limited to the northern part of the continent (Map 22); there is only one record from U.S.A. It has also been recorded from east and west Greenland (Holm 1967). On at least one occasion in N. America it has been sympatric with *W. holmi.*

Natural History.—Both sexes have been taken adult in N. America in June-August; in northern Canada (Hazen Camp: Leech 1966) the species was found in cracks in the ground where the relative humidity was approaching 100%. In Greenland, the species is found amongst mosses in bogs and luxuriant heath (Holm 1967).

Walckenaeria holmi, new species

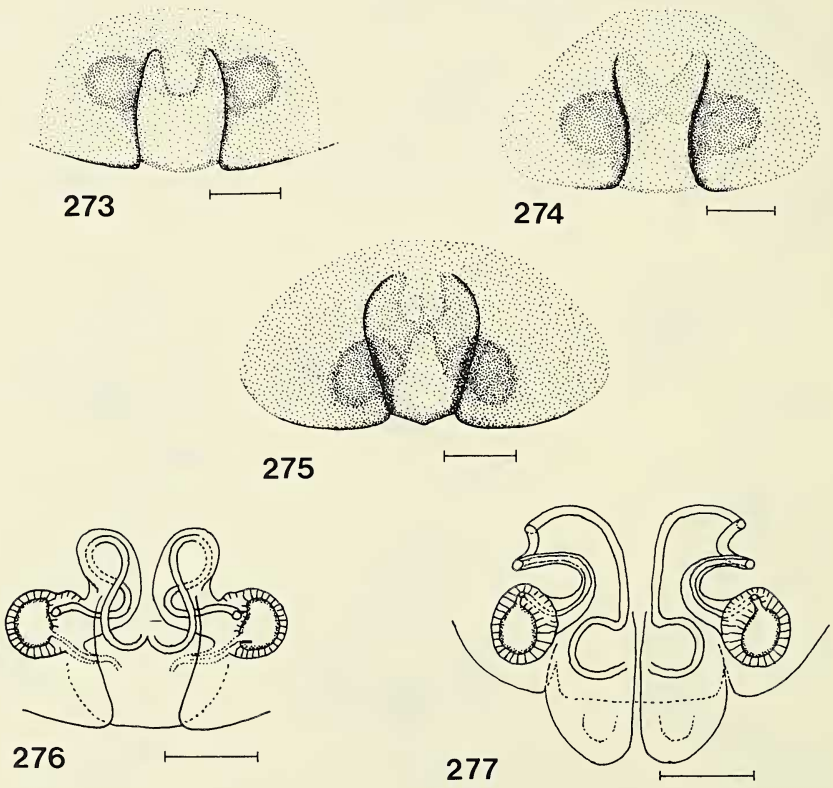
Figs. 260, 262, 265, 277, 278, 280, 282; Map 21

Cornicularia karpinskii: Holm 1967:21, and subsequent authors (misidentification: *nec Erigone karpinskii* O. P.-Cambridge).

Cornicularia clavicornis: Crosby and Bishop 1931: Figs. 18-22 (misidentification: *nec Cornicularia clavicornis* Emerton).

The species is named in honor of Dr. Å. Holm.

Type.—Male holotype from Stagg River Camp, 12 miles S.E. of Rae, Northwest Territory, 12 August 1965 (J. and W. Ivie); deposited in AMNH.

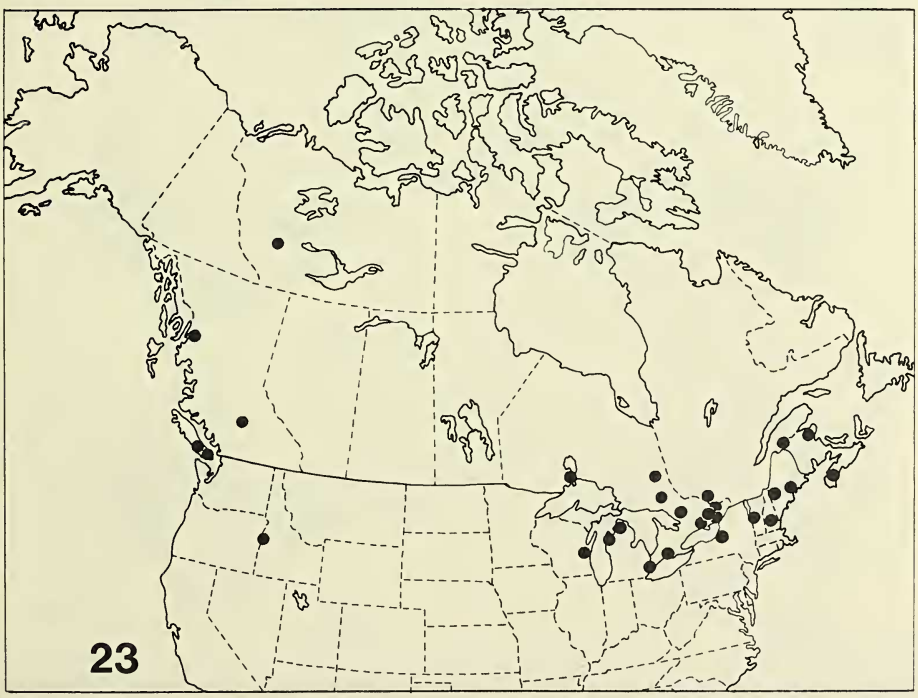


Figs. 273-277.—Epigyna, ventral. 273, *W. auranticeps*; 274, *W. lepida*; 275, *W. fusciceps*; 276, *W. auranticeps*, internal genitalia, cleared; 277, *W. holmi*, internal genitalia, cleared (Scale lines 0.1 mm).

Description.–In size, color and most other characters this species is close to *W. clavicornis*. Male palp: Figs. 260, 262, 265. Epigynum: Figs. 277, 278, 280, 282. This species has been confused in the past, both in N. America and in Europe, with *W. karpinskii* (type locality: Lake Baikal, Siberia). The male syntype of the latter species (Hope Entomological Collections, Oxford) differs from *W. holmi* in the form of the palpal tibia (Figs. 261, 264, cf. Figs. 262, 265); the distal end of the mesal apophysis is much stouter and more rounded in *W. holmi* than in *W. karpinskii*. The tibia of *W. karpinskii* seems in fact to be intermediate between those of *W. holmi* and *W. clavicornis*, with the mesal apophysis crossing the lateral apophysis much as in *W. holmi*, but with its distal end pointed as in *W. clavicornis*. The epigynum of *W. karpinskii* (female syntype) is close to that shown in Fig. 282. It is possible that *W. clavicornis* is a subspecies of *W. karpinskii*; the capture of many more examples of *W. karpinskii* would be necessary before this possibility could be properly examined. The location of the type locality makes it unlikely that this will happen.

Distribution.–This species is almost certainly holarctic in distribution; the species recorded as *W. karpinskii* in Sweden is *W. holmi*. In N. America *W. holmi* has been taken almost entirely in the more northern parts, though it occurs as far south as Wyoming in the mountains (Map 21). It has also been recorded from east and west Greenland (Holm 1967).

Natural History.–In N. America, adult females have been taken in June-September, males in June and August. Habitats were not recorded, but in Greenland (Holm 1967) the species was found amongst moss and under stones on rather moist dwarf-bush heath and in sphagnum.



Map 23.–North America. Distribution of *W. atrotibialis* (circles).

cuspidata Group

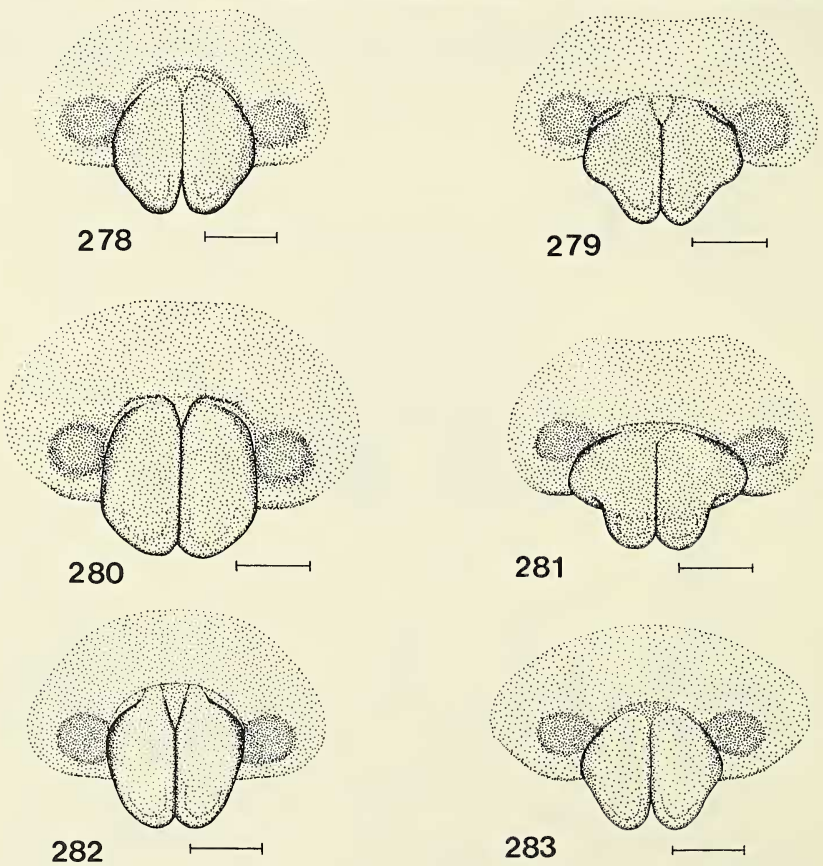
There is only one species.

Walckenaeria cuspidata brevicula (Crosby and Bishop), new status
Figs. 7, 284-291; Map 9

Walckenaera cuspidata Blackwall 1833:108.
Cornicularia cuspidata: Simon 1884:844, and 1926:418, 509; Roewer 1942:660; Locket and Millidge 1953:207; Hackman 1954:62; Bonnet 1956:1221; Wiehle 1960:151.
Cornicularia brevicula Crosby and Bishop 1931:362; Roewer 1942:662; Bonnet 1956:1221; Holm 1967:27.
Walckenaeria (Heterocornicularia) cuspidata: Wunderlich 1972:389.

Types.—Blackwall's types of *W. cuspidata* are no longer in existence. The male holotype of *W. brevicula* is not in AMNH and has not been located.

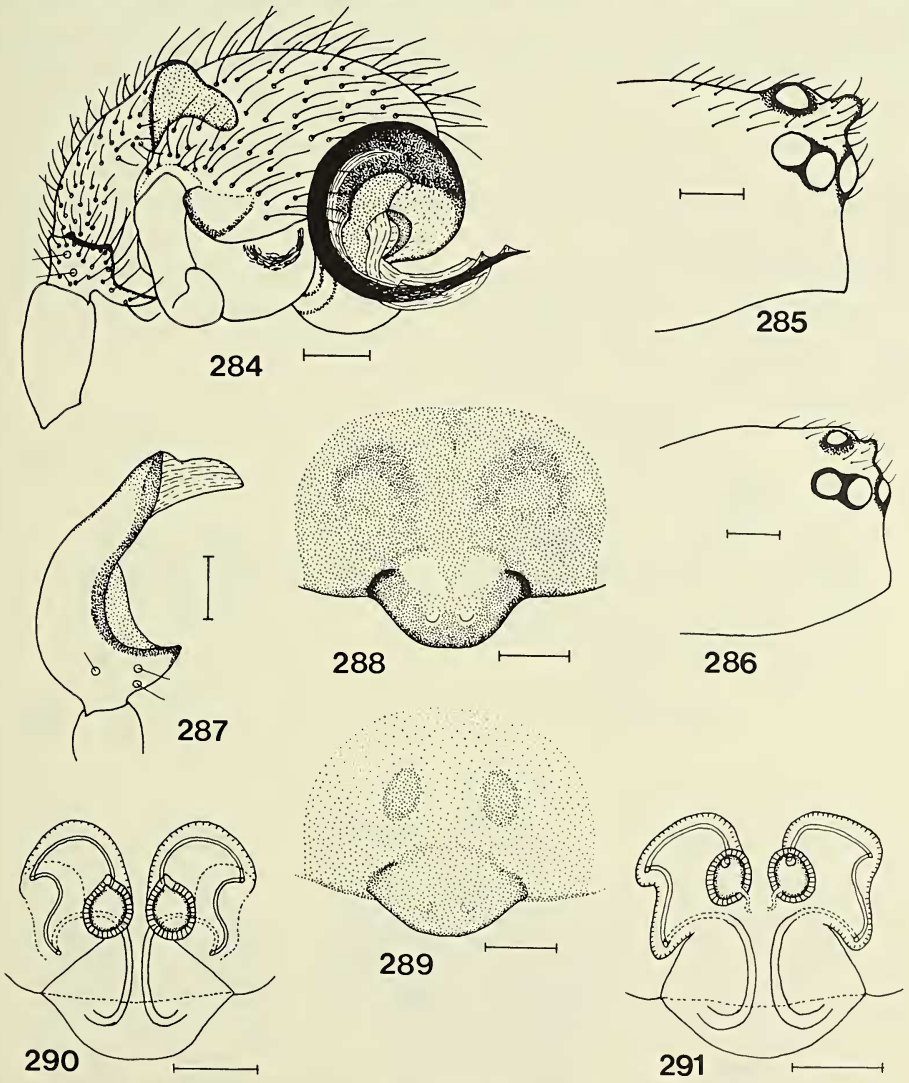
Description.—Total length: female 2.25-2.55 mm, male 2.2 mm. Carapace: length: female 1.10-1.15 mm, male 1.05 mm. Dark chestnut brown. The male has a small tubercle in the ocular area (Fig. 285); in specimens from Colorado this tubercle is



Figs. 278-283.—Epigyna, ventral. 278. *W. holmi*, New York specimen; 279, *W. clavicornis*, New Hampshire specimen; 280, *W. holmi*, Alberta specimen; 281, *W. clavicornis*, Alaska specimen; 282, *W. holmi*, Mackenzie specimen; 283, *W. clavicornis*, Hazen Camp specimen (Scale lines 0.1 mm).

minute (Fig. 286). Chelicerae: the lateral striae are fairly widely spaced in the female, less widely spaced in the male; the spacing is the female is rather wider than in European specimens. Abdomen: grey-black. Sternum: orange, suffused with black, especially on margins. Legs: pale orange to orange-brown. TmI: female 0.48-0.52, male 0.50. Male palp: Figs. 284, 287. Epigynum: Fig. 288; the spermathecae are more or less circular in outline, and usually close together (Fig. 290). In pale, presumably recently molted, females from Colorado the epigynum has a very different appearance (Fig. 289), but the internal structure (Fig. 291) shows no significant difference from that of the normal specimens.

The male palps of the N. American examples of *W. cuspidata* seem to be identical with those of the European specimens, but the females of the two populations have



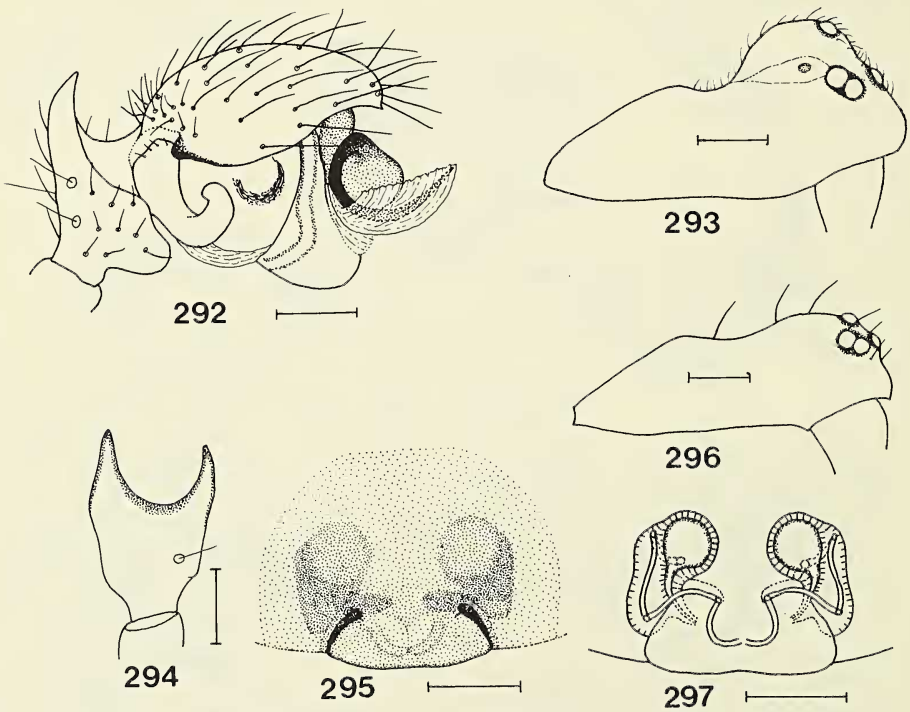
Figs. 284-291.–*W. cuspidata brevicula*. 284, male palp, ectal; 285, male carapace, lateral, Ontario specimen; 286, male carapace, lateral, Colorado specimen; 287, male palpal tibia, dorsal; 288, epigynum, usual form; 289, epigynum, Colorado specimen; 290, internal genitalia, female, cleared, Ontario specimen; 291, internal genitalia, female, cleared, Colorado specimen (Scale lines 0.1 mm).

differently shaped spermathecae. In European females the spermathecae are distinctly elongated (Figs. 301, 302), whereas in the N. American females they are rounded (Figs. 290, 291); there is some variation in the distance apart of the spermathecae, particularly in the European specimens. The cheliceral striae are somewhat more widely spaced in the American females, and the female palpal tibia is rather more swollen (as in Fig. 118, but less so) than in the European females. Because of these discrepancies, I consider it best for the present to regard the N. American population as a subspecies *(brevicula)* of *W. cuspidata.*

Diagnosis.—The male is diagnosed by the small tubercle in the ocular area (Figs. 285, 286), coupled with the form of the palp (Fig. 284) and of the palpal tibia (Fig. 287). The ocular tubercle might possibly be confused with that of *W. cornuella* (Fig. 232), but the palp of this species is quite different. The female is diagnosed by the epigynum and the internal genitalia (Figs. 288, 290), which are distinctly different from those of any other species; the possible abnormal appearance of pale specimens (Fig. 289) must be borne in mind.

Distribution.—This subspecies is probably quite widely distributed in N. America, though there are few records (Map 9). The nominate subspecies is found throughout northern and eastern Europe, and also in Siberia; the species distribution is therefore almost certainly holarctic.

Natural History.—In N. America, adult females have been taken in May, June, August and October, males in August and September. In Europe the species occupies a wide variety of habitats at ground level; the only habitat recorded in N. America is on the ground, under a board.



Figs. 292-297.—*W. atrotibialis.* 292, male palp, ectal; 293, male carapace, lateral; 294, male palpal tibia, meso-dorsal; 295, epigynum, N. American specimen; 296, female carapace, lateral; 297, internal genitalia, cleared, female, N. American specimen (Scale lines 0.1 mm, except 293, 296, 0.2 mm).

atrotibialis Group

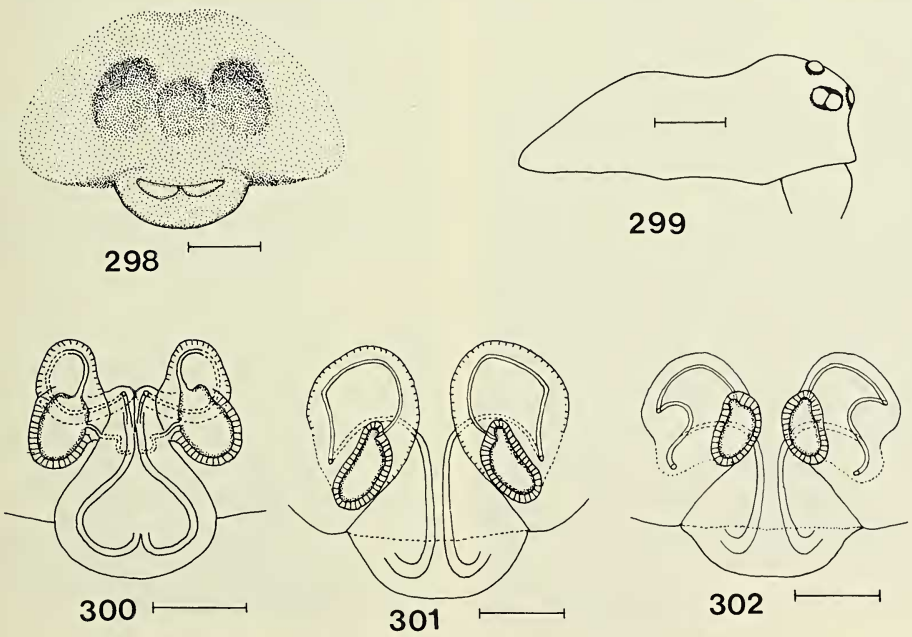
There is only one species.

Walckenaeria atrotibialis O. P.-Cambridge
Figs. 292-297; Map 23

Walckenaera atrotibialis O. P.-Cambridge 1878:116 (female).
Walckenaera melanocephala O. P.-Cambridge 1881:596 (male and female).
Wideria melanocephala: Simon 1926:409, 410, 505; Locket and Millidge 1953:196; Bonnet 1959: 4824: Wiehle 1960:121.
Walckenaeria (Parawideria) melanocephala: Wunderlich 1972:411.
Wideria atrotibialis: Roewer 1942:669.
Lophocarenum abruptum Emerton 1909:189. NEW SYNONYM. This synonymy was established by examination of Emerton's male holotype (MCZ).
Mythoplastoides abruptus: Crosby and Bishop 1933:143; Kaston 1948:184.
Entelecara abrupta: Hackman 1954:63.

Type.–Female holotype in Hope Entomological Collections, Oxford (Tube No. 3500[v]); examined. As already indicated by Jackson (1916:170) and Locket (1964: 262), this female is identical with the female subsequently (1881) described as *W. melanocephala*; despite the wide usage of the name *melanocephala*, the earlier name *atrotibialis* must be used.

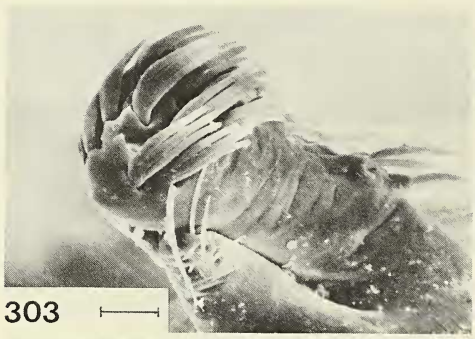
Description.–This is based on N. American specimens. Total length: female 2.5-3.1 mm, male 2.0-2.6 mm. Carapace: length: female 1.0-1.1 mm, male 0.9-1.05 mm. Orange, suffused anteriorly to a variable degree with brown; raised anteriorly in the female (Fig.

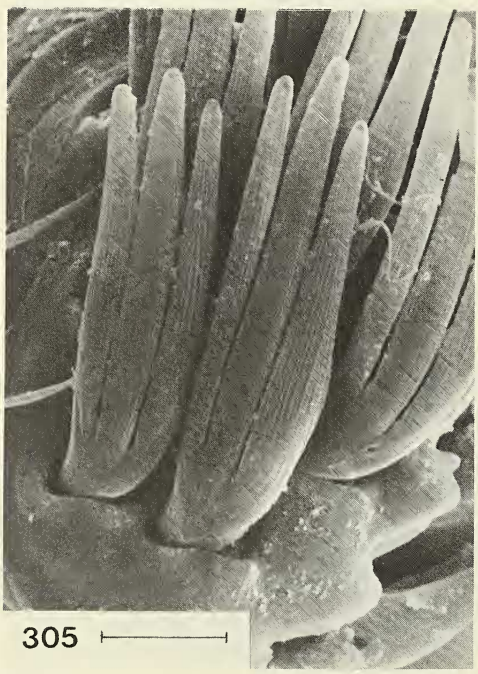


Figs. 298-302.–298, *W. fraudatrix*, epigynum; 299, *W. fraudatrix*, female carapace, lateral; 300, *W. fraudatrix*, internal genitalia, female; 301, *W. cuspidata cuspidata*, female, internal genitalia, cleared; 302, *W. cuspidata cuspidata*, female, internal genitalia, cleared, another specimen (Scale lines 0.1 mm).

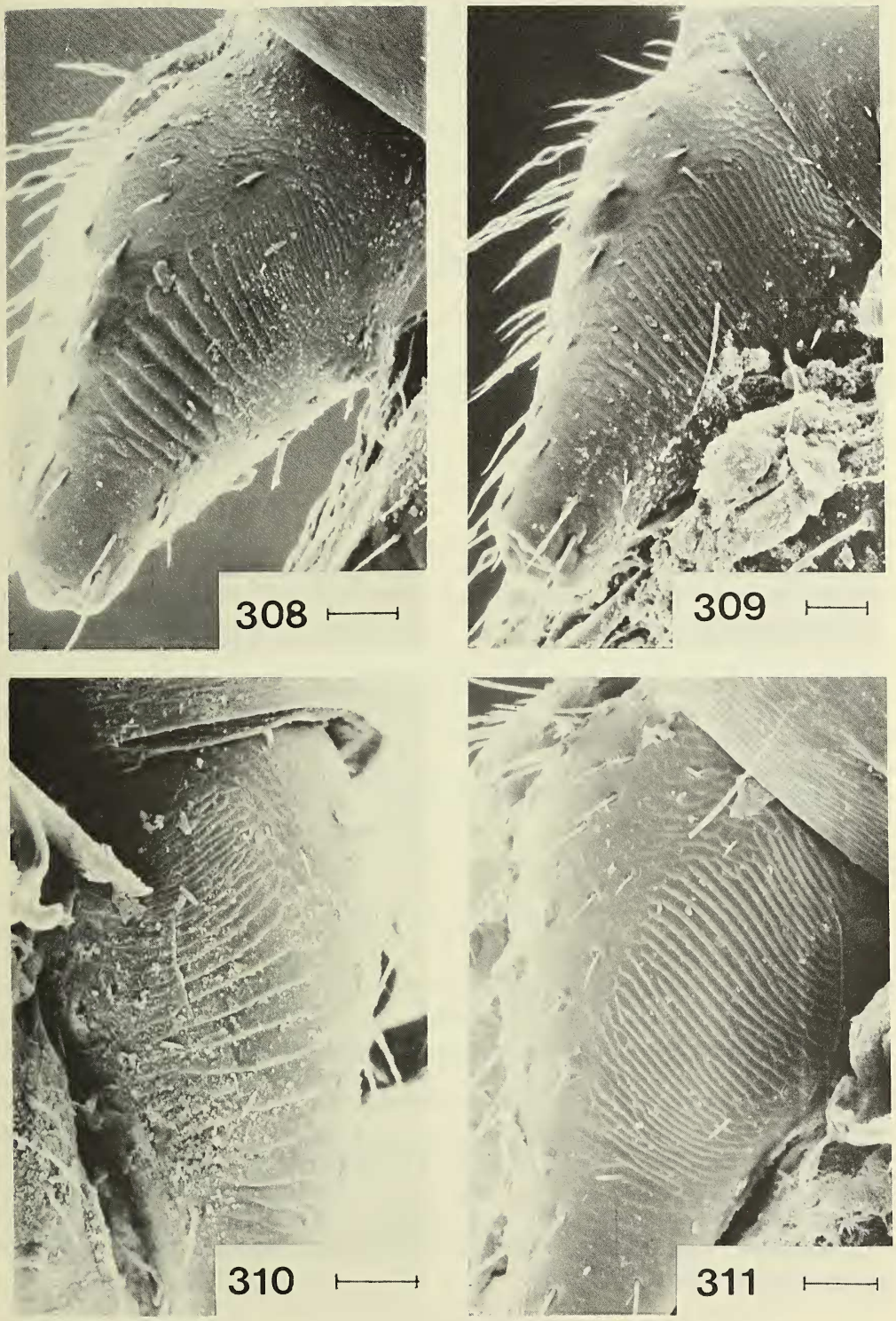
296). The male has a shallow lobe with holes and sulci laterally (Fig. 293), and the clypeus projects strongly. Chelicerae: the lateral striae are well spaced in both sexes; the spacing is more or less the same as in European specimens. Abdomen: grey to black. Sternum: orange, with dusky margins. Legs: orange-brown, with femora and tibiae of legs I-II suffused with brown to deep brown. TmI: female 0.58-0.62, male 0.51-0.58. Male palp: Figs. 292, 294. Epigynum: Figs. 295, 297. The N. American specimens show only minor differences from the European specimens; the most consistent difference is that the spermathecae, though similarly shaped, are rather smaller and further apart in the American females.

Diagnosis.—The male is diagnosed by the form of the carapace (Fig. 293), coupled with the form of the palpal tibia, which has two apophyses (Fig. 294). The female is diagnosed by the epigynum (Fig. 295) and the internal genitalia (Fig. 297), both of which are quite distinct from those of other species.





Figs. 303-307.—Scanning electron micrographs. 303, *W. directa*, male horn; 304, *W. subdirecta*, male horn; 305, *W. directa*, trifurcate hairs on male horn; 306, *W. communis*, male horn; 307, *W. pallida*, lobe of male carapace (Scale lines 20μ. except 305, 10μ).



Figs. 308-311.–Chelicerae, lateral. 308, *W. directa*, female; 309, *W. subdirecta*, female; 310, *W. directa*, male; 311, *W. subdirecta*, male (Scale lines 40μ).

Distribution.—This species is widely distributed in northern and eastern Europe, and in northern N. America (Map 23); it has not been recorded from Siberia. In addition to the records shown in Map 23, Hackman (1954) reported the species from Newfoundland (as *E. abrupta*).

Natural History.—In N. America, adults of both sexes have been taken in May-August. Habitats recorded are in woods, in grass, in calcareous and sphagnum bogs, in litter and in a soil sample.

antica Group

There is only one species recorded from N. America.

Walckenaeria fraudatrix, new species
Figs. 298, 299, 300; Map 8

Wideria antica: Holm 1960:124 (misidentification: *nec Theridion anticum* Wider).

Type.—Female holotype Kotzebue, Alaska, 13-14 August 1958 (C. Lindroth); deposited in MCZ.

Description.—Only the female is known. Total length: female 2.45 mm. Carapace: length: female 1.0 mm. Deep orange, suffused with chestnut brown anteriorly and on margins; carapace raised anteriorly (Fig. 299). Chelicerae: lateral striae fairly closely spaced. Abdomen: grey-black. Sternum: orange, suffused with black. Legs: orange. TmI: female 0.47. Female palp: brown, darker in color than the legs. Epigynum: Figs. 298, 300. The genitalia of this species differ from those of the known European species of this group (Wunderlich 1972: Kronestedt 1980).

Diagnosis.—This species is recognized by the epigynum (Fig. 298).

Distribution.—Known only from the type locality (Map 8).

Natural History.—The type female was taken adult in August; nothing was recorded on habitat.

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